THE

# OTTAWA NATURALIST,

Being Vol XXIII. of the

## TRANSACTIONS

OF THE

## OTTAWA FIELD-NATURALISTS' CLUB.

---

Organized March, 1879. Incorporated March, 1884.

---



OTTAWA, CANADA:
THE ROLLA L. CRAIN CO. LIMITED, PRINTERS
1907

# The Ottawa Field-Naturalists' Club, 1907-1908

**Patron:**

THE RIGHT HONOURABLE EARL GREY,
GOVERNOR GENERAL OF CANADA.

**President:**

W. J. Wilson, Ph.B.

**Vice-Presidents:**

A. E. Attwood, M.A. A. Halkett.

**Librarian:**

J. W. Baldwin.

**Secretary:**

T. E. Clarke, B.A.
(470 O'Connor Street).

**Treasurer:**

Arthur Gibson,
(Central Experimental Farm).

**Committee:**

Mr. J. M. Macoun
Rev. G. Eifrig.
Mr. H. H. Pitts.
Mr. E. E. Lemieux.
Mr. A. H. Gallup.
Miss I. Ritchie.
Miss A. L. Matthews.
Miss Q. Jackson.

**Auditors:**

R. B. Whyte. F. T. Shutt.

**Standing Committees of Council:**

*Publishing:* A. Gibson, J. M. Macoun, H. H. Pitts, G. Eifrig, J. W. Baldwin, Miss I. Ritchie.

*Excursions:* A. Halkett, A. Gibson, G. Eifrig, E. E. Lemieux, T. E. Clarke, Miss A. L. Matthews, Miss Q. Jackson.

*Soirées:* A. E. Attwood, H. H. Pitts, J. M. Macoun, A. H. Gallup, E. E. Lemieux, Miss A. L. Matthews.

**Leaders:**

*Geology:* H. M. Ami, W. J. Wilson, D. B. Dowling, W. H. Collins, M. F. Connor.

*Botany:* John Macoun, J. Fletcher, D. A. Campbell, A. E. Attwood, S. B. Sinclair, T. E. Clarke.

*Entomology:* W. H. Harrington, J. Fletcher, A. Gibson, C. H. Young, J. W. Baldwin.

*Conchology:* J. F. Whiteaves, F. R. Latchford, J. Fletcher, S. E. O'Brien.

*Ornithology:* G. Eifrig, W. T. Macoun, A. G. Kingston, A. H. Gallup, H. F. Tufts.

*Zoology:* E. E. Prince, A. Halkett, W. S. Odell, E. E. Lemieux.

*Archæology:* T. W. E. Sowter, J. Ballantyne.

*Meteorology:* Otto Klotz, John Macoun, A. E. Attwood, D. A. Campbell.

THE OTTAWA NATURALIST

**Editor:**

James M. Macoun, (Geological Survey of Canada).

**Associate Editors:**

Dr. H. M. Ami, Geological Survey of Canada.—Department of *Geology.*

Dr. J. F. Whiteaves, Geological Survey of Canada.—Dept. of *Palæontology.*

Dr. A. E. Barlow, Geological Survey of Canada.—Dept. of *Petrography.*

Dr. Jas. Fletcher, Central Experimental Farm.—*Botany & Nature Study.*

Hon. F. R. Latchford.—Department of *Conchology.*

Mr. W. H. Harrington, Post Office Department.—Dept. of *Entomology.*

Rev. G. Eifrig, 210 Wilbrod St.—Dept. of *Ornithology.*

Prof. E. E. Prince, Com. of Fisheries for Canada.—Dept. of *Zoology.*

Dr. Otto Klotz—Dept. of *Meteorology.*

**Membership Fee to O.F.N.C., with "Ottawa Naturalist," $1.00 per annum**

# LIST OF MEMBERS

OF THE

## Ottawa Field-Naturalists' Club

## April, 1907

Adams, *Prof.* F. D., *M.Sc.*, *Ph.D.* (Montreal).
Airth, Miss E.
Ami, H. M., *M.A.*, *D.Sc.*, *F.G.S.*, *F.R.S.C.*
Ami, Mrs. H. M.
Ami, S. T.
Anderson, Miss Constance.
Anderson, James R. (Victoria, B.C.)
Anderson, *Lieut-Col.* W. P., *C.E.*
Attwood, A. E., *M.A.*
Baldwin, J. W.
Ballantyne, James.
Bangs, J. S.
Barbour, W. C. (Sayre,Pa.)
Barlow, A. E., *M.A.*, *D.Sc.*, *F.G.S.A.*
Bate, H. Gerald.
Bate, H. N.
Bate, Miss Marjorie.
Bate, Miss Morna.
Beaupré, Edwin. (Kingston).
Bell, Robert, *B.A.Sc.*, *M.D.*, *LL.D.* *F.R.S.*, *F.R.S.C.*, *F.G.S.A.*
Bell, George.
Belliveau, A. H.
Bennett, L. H., (Regina).
Billings, C. M.
Billings, W. R.
Blackadar, *Dr.* E. H.
Blackadar, Lloyd.
Borden, *Hon. Sir* F. W., *M.D.*
Bowen, Miss Alice. (Quebec).
Bowles, Miss Sibyl M.
Boyd, Miss M.
Boyd, W. H., *B.A.Sc.*
Bradshaw, G. H. (Morden, Man.)
Brainerd, Dwight. (Montreal).
Brennan, Mrs. H. H.
Brewster, W. (Cambridge, Mass.)
Brown, Mrs. R. D.
Brown, W. J. (Westmount, Q.)
Bruce, L. (Rossland, B.C.)
Bryce, H. P., *M.D.*
Burgess, T. J. W., *M.D.*, *F.R.S.C.*, (Montreal).
Burland, G. L.
Burman, *Rev.* W. A. (Winnipeg).
Calder, Alex. (Winnipeg).
Cameron, E. R., *M.A.*
Cameron, Roy.
Casson, *Rev.* C. W.
Campbell, D. A., *B.A.*
Campbell, A. M.
Campbell, R. H.
Chalmers, Robert, *LL.D.*
Clark, G. H., *B.S.A.*
Clarke, C. K., *M.D.* (Toronto).
Clarke, T. E., *B.A.*
Cobbold, Paul A. (Haileybury, Ont.)
Cooper, H. W.
Cole, H. W.
Cole, John, (Westboro', Ont.)
Cole, Mrs. John, (Westboro', Ont.)
Collins, J. Franklin, (Providence, R.I.)
Collins, W. H.
Connor, M. F., *B.Sc.*
Coté, J. C.
Courtney, Harold D.

Cousens, W. C., *M.D.*
Cowley, Miss Mary A. (Aylmer, Q.)
Craig, *Prof.* John, (Ithaca, N.Y.)
Criddle, N. (Treesbank, Man.)
Currie, P. W.
Curry, Miss E. E.
Daly, R. A., *M.A.*, *Ph.D.*
Dawson, S. E., *Lit. D.*
Dearness, J., *M.A.* (London, Ont.)
Dempsey, J. H. C. (Hamilton).
Denny, J. D.
Director, Christian Brothers' Academy.
Dixon, F. A.
Dixon, Miss M. F.
Doherty, T. Keville.
Dowling, D. B., *B.A.Sc.*
Dulau & Co., (London, Eng.)
Dunne, J. P.
Durnford, F. G. D.
Dwight, Jonathan, Jr., *M.D.* (New York).
Eifrig, *Rev.* G.
Ells, R. W., *LL.D.*, *F.G.S.A.*, *F.R.S.C.*
Evans, Jno. D., *C.E.* (Trenton, Ont.)
Ewart, D.
Farley, F. L. (Red Deer, Alta.)
Farr, Miss E. M. (Philadelphia).
Fisher, *Hon.* Sydney.
Fitzpatrick, *Hon.* Chas.
Fleck, A. W.
Fleming, J. H. (Toronto).
Fleming, *Sir* Sandford, *K.C.M.G.*, *C.E.*, *F.R.C.I.*, *F.R.S.C.*
Fletcher, J., *LL.D.*, *F.L.S.*, *F.R.S.C.*
Fraser, Geo., (Ucluelet, B.C.)
Fraser, Miss.
Gaboury, V. H. (Plantagenet, Ont.)
Gallup, A. H.
Gibson; Arthur.
Gibson, J. W.
Gilbertson, Miss B.
Glashan, J. C., *LL.D.*, *F.R.S.C.*
Gorman, M. J., *LL.B.*
Graham, W.
Grant, *Sir* J. A., *K.C.M.G.*, *M.D.*, *F.R.C.S. Edin. F.R.S.C.*, *F.G.S.*
Gregson, Percy B. (Blackfalds, Alta.)
Grisdale, J. H., *B. Agr.*
Grist, Henry.
Grist, Miss Mary L.
Greensfelder, M. B. (Columbia, Mo.)
Halkett, Andrew.
Hamilton, Robert.
Hamilton, Mrs. F. L. H.
Hann, H. H. (Summit, N.J.)
Harcourt, Geo. (Edmonton, Alta.)
Hargrave, Miss I. (Sherbrooke, Q.)
Harmer, Miss G. (Mosgrove, Ont.)
Harrington, W. Hague, *F.R.S.C.*
Harrison, Edward.
Harvey, R. V. (Vancouver, B.C.)
Hay, George, Sr.
Hay, G. U., *D.Sc.*, *M.A.*, *Ph.B.*, *F.R.S.C.*, (St. John, N.B.)
Hayes, J. A.
Hennessey, F. C.
Herriot, W. (Galt, Ont.)
Hewit, H. O.
Hodge, C. F., *Ph.D.* (Worcester, Mass.)
Hodson, F. W.
Hodson, Mrs. F. W.
Hodson, Ronald.
Hope, James.
Houghton, J. A. (Bennington, Vt.)
House of Commons Reading Room.
Hughes, Miss Katherine.
Ide, Wm.
Irwin, *Lt.-Col.* D. T.
Jackson, Miss Queenie.
Jacobs, Miss C. M. (Hamilton, Ohio).
Jameson, R. H. (Victoria, B.C.)
James, C. C., *M.A.* (Toronto).
James, H. C.

Jenkins, S. J., *B.A.*
Joly de Lotbinière, *Hon. Sir* Henry (Victoria, B.C.)
Jones, Harold, (Maitland, Ont.)
Kearns, J. C.
Keefer, Thos. C., *C.M.G.*, *C.E.*, *F.R.S.C.*
Keele, J., *B.A.Sc.*
Kells, W. L. (Listowell, Ont.)
Kendall, E. W. (Guelph, Ont.)
Kingston, A. G.
Klotz, *Dr.* Otto.
Klugh, A. B. (Guelph.)
Labarthe, J. (Trail, B.C.)
Laidlaw, G. E., (Victoria Rd., Ont.)
Lajeunesse, *Rev.* J. A.
Lambart, *Hon.* O. H.
Lambe, L. M., *F.G.S.*, *F.G.S.A.*, *F.R.S.C.*
Latchford, *Hon.* F. R., *B.A.*
Leavitt, T. W. H. (Toronto).
Lee, Miss Kath. (Clinton, N.Y.)
Lees, Miss V.
Legislative Library, (Toronto).
Lemieux, E. E.
LeSueur, W. D., *B.A.*
Lewis, J. B., *C.E.*
Leyden, Miss M.
Library Dept. Ont. Agr. College, (Guelph).
Library of Parliament.
Liebner, E. O., *B.A.* (Brampton, Ont.)
Lingwood, Miss F. H.
Lochhead, W., *B.A.*, *M.Sc.* (St. Anne de Bellevue, Que.)
Lyman, H. H., *M.A.* (Montreal).
McCallum, Frank.
McCready, *Prof.* S. B. (Guelph).
McDougall, Miss J. C.
McDunnough, Jas. (Berlin, Germany)
McElhinney, M. P.
McElhinney, *Dr.* M. G.
McGill, A., *B.A.*, *B.Sc.*
McInnes, Wm., *B.A.*
MacLaughlin, T. J.
McLeod, Miss M. F.
McNeil, Alex.
McNabb, J.
McNichol, Miss C. C.
McQuesten, Miss Ruby B.
MacCraken, John I., *B.A.*
MacKay, A. H., *LL.D.*, *B.Sc.*, *F.R.S.C.* (Halifax).
Macoun, *Prof.* John, *M.A.*, *F.L.S.*, *F.R.S.C.*
Macoun, J. M.
Macoun, W. T.
Malcolm, Jno. (Fergus, Ont.)
Matthews, Miss Annie L.
Mearns, *Dr.* E. A. (Washington, D.C.)
Megill, W. H. T., *B.A.*
Metcalfe, W.
Millar, H. H. (Calgary).
Miller, *Prof.* W. G. (Toronto).
Milne, Wm.
Moore, W. H. (Scotch Lake, N.B.)
Morris, F. J. A. (Port Hope, Ont.)
Murray, James, *B.S.A.* (Regina, Sask.)
Nash, C. W. (Toronto).
Nelles, D. H., *D.L.S.*
Newcombe, C. F., *M.D.* (Victoria, B.C.)
Newman, L. H., *B.S.A.*
O'Brien, S. E.
Odell, W. S.
Orde, J. F.
O'Sullivan, Owen.
Owen, Beverley.
Perrin, Vincent, *C.E.*
Pitcher, *Rev.* T.
Pitts, H. H.
Prince, *Prof.* E. E., *B.A.*, *F.L.S.*
Putman, J. H., *B.A.*
Raine, Walter, (Toronto).
Richard, A. E.
Ritchie, Miss Isabella.
Robertson, *Prof.* J. W., *LL.D.* (St. Anne de Bellevue, Que.)
Robinson, Miss M.

Rodman, Miss A. E.
Ruddick, J. A.
Rush, M. L.
Saunders, Wm., *C.M.G.*, *LL.D.*, *F.G.S.*, *F.L.S.*, *F.R.S.C.*
Saunders, W. E. (London, Ont.)
Saunders, H. S. (Toronto).
Scott, Geo. Inglis.
Scott, Mrs. G. I.
Scott, Norman M.
Scott, John A.
Scott, Harry S.
Scott, Miss Mary McKay.
Scott, W., *B.A.* (Toronto).
Scott, *Rev.* C. T. (Montreal, Que.)
Senate of Canada, The.
Seton, E. Thompson, (Coscob, Conn.)
Shannon, Frank.
Shearman, F. J. W.
Shore, John W.
Shutt, F. T., *M.A.*, *F.I.C.*, *F.C.S.*, *F.R.S.C.*
Simpson, Willibert.
Sinclair, S. B., *B.A.*, *Ph.D.*
Skales, Howard, (Mt. Forest, Ont.)
Small, H. Beaumont, *M.D.*
Snider, W. W.
Soper, John.
Sowter, T. W. E.
Souliere, O.
Spence, J. C., *B.A.*
Spreckley, R. O.
St. Jacques, H.
Summerby, Wm. J., *M.A.* (Russell, Ont.)
Sutherland, J. C., *B.A.* (Richmond, Que.)
Sutton, Mrs. L. L.
Sullivan, J. F.
Symes, P. B.
Taylor, F. B. (Fort Wayne, Ind.)
Terrill, L. M. (Montreal).
Thompson, R.
Thomson, Evan, (Red Lodge, Alta.)
Thorne, James, *B.A.*
Topley, Mrs. W. J.
Tufts, H. F.
Tyrrell, J. B., *B.A.*, *B.Sc.*, *F.G.S.*, *F.G.S.A.* (Toronto).
Walker, B. E., *F.G.S.* (Toronto).
Walker, Bryant, (Detroit).
Wallis, J. B. (Winnipeg, Man).
Warwick, F. W., *B.Sc.* (Buckingham, Que.)
Weston, T. C., *F.G.S.A.* (Minneapolis, Minn.)
Whelen, Peter.
Whelen, Miss A.
White, E. G.
White, George R.
White, James, (Snelgrove, Ont.)
White, J. F., *M.A.*
White, *Lt.-Col.* W., *C.M.G.*
Whiteaves, J. F., *LL.D.*, *F.G.S.*, *F.R.S.C.*, *F.G.S.A.*
Whyte, Miss Ida.
Whyte, Miss Isabella.
Whyte, R. B.
Williams, Miss M. B.
Williams, J. B., (Toronto).
Willing, T. N., (Regina, Sask.)
Wilson, W. J., *Ph.B.*
Wilson, E. (Armstrong, B.C.)
Winchester, H. S.
Wood, *Hon.* Josiah, (Sackville, N.B.)
Young, C. H.

---

## CORRESPONDING MEMBERS

BETHUNE, REV. C. J. S., *M.A.*, *D.C.L.*, *F.R.S.C.*, Guelph, Ont.
GREENE, DR. E. L., United States National Museum, Washington, D.C.
HILL, ALBERT J., *M.A.*, *C.E.*, New Westminster, B.C.
HOLM, THEODOR, *Ph.D.*, Brookland, Washington, D.C., U.S.
[illegible], Department of Agriculture, Washington, U.S.
SMITH, PROF. JOHN B., *D.Sc.*, Rutger's College, New Brunswick, N.J.
TAYLOR, REV. G. W., *M.A.*, *F.R.S.C.*, *F.Z.S.*, Wellington, B.C.
WICKHAM, PROF. H. F., Iowa City, Iowa, U.S

# THE OTTAWA NATURALIST

Vol. XVIII. OTTAWA, APRIL, 1907 No. 1

## THE REPORT OF THE COUNCIL OF THE OTTAWA FIELD-NATURALISTS' CLUB FOR THE YEAR ENDING MARCH 19TH, 1907.

The Club membership has now passed the 300 mark. During the year twenty-three new ordinary members have been elected, bringing the present membership up to 301, composed of 293 ordinary members and eight corresponding members.

### Soirées.

The Soirée Committee is to be congratulated upon the excellent programme of lectures it has provided this winter and also upon its departure in printing the programme in neat pocket form, besides publishing it as usual in The Ottawa Naturalist.

The opening soirée was held on December 6th, when the President, Mr. Wilson, gave an able and timely address on the benefits and pleasures to be derived from a participation in the work of the Club. Dr. Jas. Fletcher then read a short paper, prepared by Prof. Bradley, of the University of California, on "An Entomological Excursion to the Selkirk Mountains." The paper was illustrated by a number of excellent slides. The remainder of the evening was given up to a demonstration exhibition. Rev. Mr. Eifrig, by means of mounted specimens, a field glass, and popular books on birds, gave a demonstration of first steps in ornithology, using color as a means of identification.

On January 8th, Mr. D. A. Campbell gave a demonstration on the Physics of the Atmosphere. The various laws of gases and many interesting phenomena were illustrated in a series of well-chosen experiments, so skilfully performed as to call forth frequent applause.

Dr. P. H. Bryce, Chief Medical Officer of the Dept. of the Interior, addressed the Club on The Relation of Climate to Health, with special reference to prevention and treatment of tuberculosis. This address, one of the ablest ever delivered before the Club, is shortly to appear in full in The Ottawa Naturalist.

On February 12th, Dr. R. N. Daly gave an address before a large audience on The Physical Conditions of Life in the Deep Seas. He pointed out the factors, such as temperature, presence of light, heat, air, low pressure, wave motion, and the facility of obtaining food, that make life more abundant near the surface than at greater depths. Deep sea types were then described with the conditions under which they live.

In the absence of Dr. Robertson, the paper on The Macdonald College was given by Prof. Lochhead of that institution, who described the college at Ste. Anne de Bellevue, and dealt with the great educational value of the work which Sir Wm. Macdonald's generosity is making possible.

The paper to have been given on March 12th, by Mr. Stewart on The Forestry Problem had to be cancelled because of Mr. Stewart's removal to Montreal. On that date Dr. Fletcher read before the Club a chapter on The Grey Wolf, from the manuscript of Mr. Ernest Thompson Seton's forthcoming book, The Mammals of Manitoba. The chapter describes the appearance, habits, and range of the Grey Wolf, and is replete with stories gleaned from all sources from Hudson Bay days to the present time. On the same evening, Dr. Ami presented the Report of the Geological Branch, and gave an illustrated address on The Methods of Work of the Ottawa Field-Naturalists' Club. Some of the slides shown illustrated local geology, especially as observed in excavations made during the past few years, and others exhibited the kind of work done by the Club on its Saturday excursions and in connection with the Summer School of Science.

Mr. Ernest Thompson Seton, a valued member of the Club, very kindly gave an illustrated lecture on Animal Minds and Heroes, on the evening of February 16th, before an audience that completely filled the large Assembly Hall of the Normal School. Mr. Seton held his audience in the closest attention for a space of an hour and three-quarters while he described the famous heroes of animal history. To quote from a lengthy press notice, "Delivered with fire of oratory, and enlightened with frequent flashes of the keenest wit, the address was one of the best heard in Ottawa for many years."

### EXCURSIONS.

The following programme of excursions was drawn up:

April 28th, Blueberry Point, Aylmer.
May 5th, Rockliffe Park.
May 12th, Beaver Meadow, Hull.
May 19th, Cement Works, Hull.
May 26th, General Excursion, Chelsea.
June 2nd, Experimental Farm.

June 9th, Rideau Park.
June 16th, General Excursion, Galetta.
June 23rd, Hemlock Lake.
Sept. 18th, General Excursion, Chelsea.
Feb. 9th, Snowshoe Tramp, Beaver Meadow.
Feb. 23rd, Snowshoe Tramp, Rockliffe.

The Club regards its excursions as the strongest means of awakening public interest in its work and enlisting new members. This year, special efforts had been put forth to make the excursions as successful as possible, but an unusual number of rainy Saturdays interfered with the plans of the Club. When weather conditions were favorable, however, the excursions were well attended, and much good work was done, as appears in the reports of the excursions published from time to time in THE OTTAWA NATURALIST. The snowshoe tramps have shown that a great deal of field work can be carried on in winter. The botanists, for example, observed at Beaver Meadow the distribution of evergreens and deciduous trees, the occurrence of species easily passed by unnoticed in summer, the branching of deciduous trees, the persistent fruit of the Climbing Bittersweet, the characteristic winter appearance of the Juniper, various methods of bud-protection, and many other interesting features of winter vegetation. A continuance of field work in winter would be certain to reveal many things to which attention has not yet been directed because of the unfamiliarity of people in cities with woods in winter.

## THE OTTAWA NATURALIST.

Volume XX of THE OTTAWA NATURALIST, the official organ of the Club, has been published under the editorship of Mr. J. M. Macoun. It consists of twelve numbers which contain in all 253 pages and two plates. The following are among the papers that appear in this volume:

1. Notes on a Collection of Fossil Fruits from Vermont, in the Museum of the Geological Survey of Canada, Dr. H. M. Ami.
2. On the Structure of Roots, Theo. Holm.
3. A May Morning with the Birds in New Brunswick, W. H. Moore.
4. List of some Fresh-water shells from Northwestern Ontario and Keewatin, Dr. J. F. Whiteaves.
5. The Migration of Birds, Rev. C. Eifrig.
6. The Ottawa Species of Eriophorum, J. M. Macoun.
7. A Sagacious Crow, A. H. Gallup.
8. The Chambord Meteorite, R. A. Johnston.
9. Nesting of Wilson's Snipe, Wm. L. Kells.

10. Some Canadian Antennarias, Dr. Ed. L. Greene.
11. The Caribou of Queen Charlotte Islands, J. M. Macoun.
12. Ivy Poisoning and its Treatment, J. M. Macoun.
13. The Great Gray Owl, Rev. C. W. G. Eifrig.
14. The Species of Botryocrinus, F. A. Bather.
15. Some New Plants from the Canadian Rockies and Selkirks, Edith M. Farr.
16. Richardson's Merlin, W. J. Brown.
17. Bird Migration, Sable Island, James Boutelier.
18. Notes on Cyrtoceras cuneatum, Dr. J. F. Whiteaves.
19. Contributions to Canadian Botany, J. M. Macoun.
20. Spring Migration of Birds at Ottawa, 1906, Rev. C. Eifrig.
21. Animal Coloration, Prof. E. E. Prince.
22. The Cryptogamic Flora of Ottawa, Prof. Jno. Macoun.
23. A Visit to Duck Island, Hon. F. R. Latchford.
24. The Teal Weed of St. Clair Flats, J. Maughan.
25. Description of Eupithecia Fletcherata, Geo.W Taylor.
26. A Swarm of Butterflies, Geo. H. Bradshaw.
27. Notes on the Skeleton of a White Whale, Dr. J. F. Whiteaves.
28. Some Curious Facts about Fishes, Andrew Halkett.
29. The Disappearance of the Passenger Pigeon, J. H. Fleming.
30. Meteorological Observations at Ottawa, Wm. Ellis.

In addition to these, there have been published several botanical and ornithological notes, book reviews, reports of soirées, excursions, and branch meetings.

The series of articles on Nature Study, edited by Dr James Fletcher, has been continued, bringing the number of papers published during the past four years up to 42. In this volume the following papers appear:

33. Definite Problems in Nature Study, Dr. S. B. Sinclair.
34. A Cement Sidewalk, S. B. McCready, B.A.
35. The Galt Park Wild-Flower Garden, R. S. Hamilton.
36. The Foundations of Chemistry as seen in Nature Study, Jno. Brittain.
37. The Cecropia Emperor Moth, Arthur Gibson.
38. School Exhibits of Pressed Plants, Dr. J. Fletcher.
39. Agencies for the Promotion of Nature Study in Canada, Prof. Lochhead.
40. Manual Training—the Mechanical Hobby, Dr. Mark G. McElhinney.
41. Manual Training—the Machinist's Art, Dr. Mark G. McElhinney.
42. The Relation of Sparrows to Agriculture, L. H. Newman.

Your Council, believing that this series of articles is one of the most important contributions made to the science of Nature Study, regrets to report that Dr. Fletcher finds himself compelled to cease editing this department of THE OTTAWA NATURALIST. The Club has on hand 250 copies of each of the forty-two articles printed, and the publishing committee has under consideration the question of binding these in book form.

## REPORTS OF BRANCHES.

These reports, showing the work done throughout the year by the various branches, are being presented at this meeting, and will be published in THE OTTAWA NATURALIST at an early date. Your Council has instituted a Department of Meteorology under the leadership of Dr. Otto Klotz. One of the leaders of this department, Mr. Campbell, gave a Demonstration on the Physics of the Atmosphere before a largely attended meeting in the Ottawa Collegiate Institutte.

## ENTOMOLOGICAL BRANCH.

The members of the Entomological Branch of the Club have continued their good work in the collection and study of the insects of the Ottawa District. The leaders report that, although the season was not a particularly good one for insects, still many interesting species were taken, and considerable progress made in adding to the lists of the various orders. Notable features of the year were a remarkable outbreak of plant lice on almost all cultivated and wild plants up till midsummer, followed by the appearance of hordes of lady-bird beetles, which very soon destroyed the larger number of the plant lice. It was noticed that very many of these predaceous friends were similarly destroyed by parasites. The White Cedars throughout the district were very much injured by the larvae of two minute moths, *Argyresthia thuiella*, and in far smaller numbers, *Recurvaria thujaella*. An interesting occurrence was of a Nitidulid beetle, the larvae of which were very destructive to the seeds of the Silver Maple. The entomologists announce the appearance in the Ottawa district of an undesirable visitor in the shape of the Asparagus Beetle, which has done so much harm in western Ontario. An insect which last season appeared in vast numbers was the Greenhouse White-fly (*Aleyrodes vaporariorum*), which was abundant on many herbaceous plants and ornamental shrubs in gardens.

## ORNITHOLOGICAL BRANCH.

Since the last annual report the Ornithological Section has held meetings at more or less regular intervals. More than

usually complete observations on the spring migration of birds in the district were made and recorded, also anomalies, rareties and irregularities in the air forms of the vicinity considered. Further progress was made in the revision of the published air-faunal list of the Ottawa district, with a view of augmenting and correcting it to date. As a none too common occurrence in the bird world of the vicinity may be mentioned the unusual migration of the Goshawk (*Accipiter atricapillus*) noted last October and November.

## THE LIBRARY.

In accordance with the report of the Library Committee adopted at the last annual meeting, the bound volumes and the exchanges were transferred from the Normal School to the Carnegie Library. All exchanges received during the past year are now stored in the Normal School. Many of these are of a technical nature, but the Club receives a number of publications which are of a more popular character, including:

1. The Nature Study Review.
2. The Journal of Geography.
3. The Auk.
4. The Canadian Entomologist.
5. The Wilson Bulletin.
6. The Ohio Naturalist.
7. Le Naturaliste Canadien.

Under present conditions no use is made of these by the members.

In addition to its periodical exchanges, the Club has received numerous government reports from Washington and Ottawa, and the following bound volumes have been placed on the shelves:

1. Anatomical Nomenclature, Dr. Barker, Prof. of Medicine, Johns Hopkins University.

2. A Loose-Leaf System of Laboratory Notes, Theo. Scheffer, Kansas State Agricultural College.

3. Annual Report of the Smithsonian Institute.

4. Report of the Welcome Research Laboratories at the Gordon Memorial College, Khartoum.

A Summer School of Science under the direction of Mr. J. H. Putman, gave a three weeks' course for teachers in July. Several members of the Club delivered lectures at the Normal School and aided in the field work. Mr. Putman gave a course in Botany, Mr. Attwood one in Mineralogy, and Mr. Sullivan took charge of the field work. Dr. Fletcher gave two lectures on Birds, and two on Insects. The leaders of the Club also contribute very largely to the lecture programmes of various societies in the city.

The Club notes with pleasure the honor conferred upon two former Presidents. Dr. J. F. Whiteaves has been awarded the Lyell medal by the Geological Society of London, an honor that has been conferred upon only two other Canadian scientists, Sir William Dawson, and Prof. Frank Adams; and Dr. R. Bell has been awarded the Patron's Gold Medal by the Royal Geographical Society, the Cullum Gold Medal by the American Geographical Society, and the Queen's Coronation Gold Medal for geological work in Canada.

The Club desires to express its gratitude for the appreciation of its work shown by the Ontario Legislature in increasing the annual grant from $200 to $300.

The Treasurer's Report shows a balance on hand of $48.63.

The thanks of the Club are due to Principal White for placing the Normal School at its disposal, to the Library Board of the City Council, and to the Librarian, Mr. Burpee, for the use of the Lecture Hall of the Carnegie Library, and to the Press of the city for its efforts in furthering the work of the Club.

All of which is respectfully submitted.

T. E. CLARKE,
Secretary.

## TREASURER'S STATEMENT FOR YEAR ENDING 19TH MARCH, 1907.

### RECEIPTS.

| | | |
|---|---|---|
| Balance from previous year | | $61 62 |
| Subscriptions—1906-1907 | 97 00 | |
| Arrears | 58 00 | |
| | | 155 00 |
| Advertisements in OTTAWA NATURALIST | | 101 40 |
| Author's extras sold, including separates of Nature Study articles | | 61 60 |
| OTTAWA NATURALISTS sold | | 26 10 |
| Government Grant | | 300 00 |
| | | $705 72 |

### EXPENDITURE.

| | | |
|---|---|---|
| Printing OTTAWA NATURALIST, Vol. XX, 12 Nos., 253 pages | $316 10 | |
| Illustrations | 6 93 | |
| Author's extras, including Nature Study separates | 121 50 | |
| Miscellaneous printing—wrappers, post cards, etc | 60 40 | |
| | $504 93 | |
| Postage | 24 31 | |
| Editor | 50 00 | |
| | $579 24 | |
| Less 5 per cent. for cash on part of printers' accts. | 23 88 | |
| | | 555 36 |
| Secretary | | 25 00 |
| Treasurer | | 25 00 |
| Soirée expenses | | 20 75 |
| Library expenses | | 16 20 |
| Sundry expenses, postage, etc | | 14 78 |
| Balance | | 48 62 |
| | | $705 72 |

ARTHUR GIBSON, *Treasurer.*

Examined and found correct,

R. B. WHYTE,
A. H. GALLUP, } *Auditors.*

Subscriptions for the new club year are now due, and should be paid at once.

The Treasurer would again direct attention to the advertisements in our new volume. Some of these appear now for the first time, and members are asked to remember the different firms when making purchases. They are all good, reliable firms, and, as they are helping the Club by giving advertisements, we should all make it a point to deal with them.

# ON A TOOTH OF OVIBOS, FROM PLEISTOCENE GRAVELS NEAR MIDWAY, B.C.*

By Lawrence M. Lambe, F.G.S., F.R.S.C., of the Geological Survey of Canada. *(With plate).*

An upper molar tooth of a ruminant has lately been presented to the Geological Survey by Mr. C. B. Bash, of Greenwood, British Columbia, who states in a letter accompanying the specimen that it is from Rock Creek about eight miles above its entry into Kettle River, and about four miles north of the International Boundary. Rock Creek joins Kettle River from the west about thirteen miles west of Midway. The tooth was found on a rock surface beneath a deposit of unconsolidated gravel, about two hundred feet in thickness, in a tunnel run into a hill in connection with placer mining.

The tooth received from Mr. Bash is the posterior true molar from the right side, and is referred provisionally to the genus Ovibos. In comparison with the corresponding tooth of an adult male musk-ox (*O. moschatus*, Zimm.) from Fort Rae, Great Slave Lake, in the Museum of the Geological Survey, it is seen to be slightly smaller and less robust but otherwise remarkably similar.

Remains, principally the hinder portion of skulls with horn-cores attached, from the Pleistocene of the United States, have been assigned to the genus Ovibos or related genera under a number of specific names, some of which are apparently synonyms. *Ovibos bombifrons* (Harlan) is from the Pleistocene of Kentucky; *O. cavifrons* (Leidy) is recorded from deposits of the same age in Indian Territory, Missouri, Kentucky, Ohio, Iowa, and Alaska, and both were included by Leidy in his genus Bootherium. A third species is *O. appalachiolus* (Rhoads), from the Pleistocene of Pennsylvania.

There are few records of the finding of the remains of Ovibos in Pleistocene deposits in Canada. Dr. George M. Dawson, in his Summary Report for 1898, p. 19 A, mentions the finding of portions of a skull of a musk ox in old gravel deposits (Pleistocene) near Edmonton, Alberta. In his Report on the Klondike Gold Fields, 1905, p. 29B, Mr. R. G. McConnell refers to musk-ox, mammoth, buffalo, bear and mountain sheep and goat remains in the "low level creek gravels" of the Klondike district which are most probably of Pleistocene age, judging from the occurrence of mammoth bones in them. Lydekker in his Catalogue of Fossil Mammalia in the British Museum, pt. II, 1885, p. 39, refers, under the heading *Ovibos moschatus*, to a specimen

*Communicated by permission of the Acting Director of the Geological Survey of Canada.

consisting of the "hinder portion of the cranium of a small individual with part of the horn-cores," from the Pleistocene of the Upper Porcupine River, Yukon.

In the "Smithsonian Miscellaneous Collections," Vol. III, pt. 2, 1905, is a paper on "Scaphoceros* tyrrelli, an extinct ruminant from the Klondike gravels," by Wilfred H. Osgood. This paper is descriptive of the skull of an animal considered by Mr. Osgood to be "evidently related to the existing genus Ovibos, but sufficiently different to rank as a separate genus." The type skull is from Bonanza Creek. The remains of musk-oxen in the Yukon mentioned by Mr. McConnell in his report are the specimens on which this new genus has been established. Mr. Osgood in his important and interesting paper also reviews the literature of Pleistocene species of Ovibos. He assigns *O. cavifrons* (Leidy) to Scaphoceros, and retains the genus Boötherium with *bombifrons* as the type. In the skull of *Scaphoceros tyrrelli* from Bonanza Creek the teeth are preserved, an important feature, as no teeth have been found with the Pleistocene remains generally hitherto referred to the genus Ovibos under different specific names in Canada and the United States.

The tooth from Rock Creek, B.C., is in diameter about three-fifths the size of the last upper molar of *S. tyrrelli*, and its proportions are quite different. As already mentioned, it is nearly but not quite the size of the posterior molar of an adult male of *Ovibos moschatus* in the Museum of the Geological Survey, and in most particulars agrees very closely with it. As the styles or costæ are more slender, is is for the present only provisionally referred to the living form. In comparison with the corresponding tooth of an adult specimen of *Ovis montana* Cuv., the Mountain sheep or Big-horn, there are general resemblances. It is in size between the tooth of the mountain sheep and the musk-ox, but more nearly approaches the latter.

Figures in the accompanying plate are given of the tooth from Rock Creek. In comparing it with the corresponding tooth of the adult male musk-ox from Fort Rae, the three costæ or styles of its outer surface are seen to be more slender, but the proportionate development of the intermediate costæ or longitudinal ribs is about the same, and the tooth pattern is almost identical. The Rock Creek specimen is moderately worn and the posterior cement lake (valley) in the grinding surface connects at its anterior end with the longitudinal depression between the lobes on the inner side of the tooth. The complete enclosure of

*The generic term Symbos has since been substituted by Mr. Osgood for Scaphoceros (preoccupied). Vide, Proceedings Biological Society of Washington, Vol XVIII, p. 223, Oct. 17, 1905.

this lake would have taken place when the tooth had been worn down about 12 mm. more. The transverse section (Fig. 1 *c*) a little below the mid-height of the tooth (at *d*, Fig. 1) shows the posterior lake isolated with the addition near the inner dentinal point of the lobes of the "small accessory valley (*e*, Fig. 1 *c*), to which attention is called by Dr. E. Lönnberg in his paper 'On the Structure and Anatomy of the Musk-ox.'"*

In the Fort Rae musk-ox the first and second upper true molars show this accessory valley well developed, and the third molar, which is not so much worn as the other two teeth, shows it in process of formation, but still attached to and continuous with the anterior cement lake. In this specimen only the small portion of the teeth above the alveolar border is available for examination.

In the specimen of *Ovis montana* neither of the cement lakes in the grinding surface of the last upper molar (very little worn) are completely enclosed; the anterior one communicates with the inner longitudinal furrow and also by a narrow surface with the posterior lake. With further wear (Fig. 2, section at mid-height of tooth) the two lakes become enclosed and distinct, but without the formation of the "small accessory valley." A second section nearer the base of the tooth reveals this small valley well formed. The first upper true molars in the same skull show this valley very plainly in the grinding surface, and it appears in a section at mid-height in the second molar. The "small accessory valley" is thus seen to be developed in both the musk-ox and the mountain sheep in the true molars. The styles of the Rock Creek tooth have about the same prominence and thickness as those of the sheep.

The Rock Creek tooth is without the "accessory column" that is stated to arise in Ovibos* at the base of the inner surface of the molars between the two lobes. This column is, however, apparently absent in the third upper molar of Ovibos. In the second and third upper molars of the mountain sheep examined there is no trace of this column.

Measurements of the Rock Creek tooth (moderately worn), and those of the corresponding tooth in *Ovibos moschatus*

*Proceedings of the Zoological Society of London for the year 1900, p. 712.

*Lönnberg, op. cit., p. 712.

†Osgood, op. cit., p. 177.

(much worn), and *Ovis montana* (slightly worn) are here given:

| | Rock Creek tooth. | Ovibos moschatus. | Ovis montana. |
|---|---|---|---|
| Height or length of tooth..... | 54 mm. | Ap. 40 mm. | 55 mm. |
| Maximum anteroposterior diameter at grinding surface..... | 25 mm. | 31 mm. | 18 mm. |
| Same at mid-height..... | 29 mm. | | 25 mm. |
| Transverse diameter (width) of posterior lobe at grinding surface..... | 10 mm. | 12 mm. | 6 mm. |
| Same at mid-height..... | 13.5 mm. | | 11 mm. |
| Transverse diameter (width) of anterior lobe at grinding surface..... | 12 mm. | 13 mm. | 9 mm. |
| Same at mid-height..... | 15.5 mm. | | 12.5 mm. |

In attempting, therefore, to determine whether the Rock Creek tooth is properly referable to the musk-ox or to the mountain sheep, the absence of the "accessory column" in the specimen does not afford any help in this particular case, and the presence of the "small accessory valley" is a character belonging to both animals. According to Dr. Lönnberg, "in sheep and goats this 'accessory valley' seems to be less constantly developed" (op. cit., p. 712), than in many members of the Bovidæ. Depending principally on its size and general robustness the Rock Creek tooth is provisionally referred to the musk-ox (*Ovibos moschatus*, Zimm.) in the belief that it may have belonged to a rather small individual.

The unconsolidated gravel under which the tooth was found is evidently of Pleistocene age. The enamel of the specimen varies in places from deep to light bluish-grey in colour, with a few irregular patches that are almost white. The dentine is of a very dark brown or almost black colour, with the cement a shade lighter. Dr. Reginald Daly, geologist for Canada to the International Boundary Commission, who is familiar with the geology of the Rock Creek district, says that the only unconsolidated gravels occurring there are, in his judgment, of glacial origin and of Pleistocene age.

## EXPLANATION OF PLATE.

FIGURE 1.—Right posterior upper true molar of ruminant (Ovibos) from Rock Creek, B.C.; exterior aspect.

FIGURE 1*a*.—The same viewed from within.

FIGURE 1*b*.—The grinding surface of the same viewed from below.

FIGURE 1*c*.—Transverse section of the same at *d*, fig. 1.

FIGURE 2.—Transverse section at mid-height of the crown of the corresponding tooth of an adult mountain sheep (*Ovis montana*, Cuv.) *e*.—"Small accessory valley."

All the above figures are of natural size.

# THE EVOLUTION OF THE MACDONALD COLLEGE.

Professor W. Lochhead, of the Macdonald College, Ste. Anne de Bellevue, gave an address to the members of the Field Naturalist's Club on the above subject in the Normal School on the evening of February 26th.

The speaker said, in part: The Macdonald College, as a future training school for young men and women for rural life, like every other great work, is the product of adequate causes; it is the result of ideas and tendencies that have been manifesting themselves for many years in the educational world; it is an expression of the Educational Unrest that makes for real progress in the efforts to adapt our educational system and methods to the conditions and needs of our time.

There is a rural life, and there is a town or urban life, with distinctly different conditions and problems. A large percentage of our people live on farms, while all are dependent, either directly or indirectly, on the farms for their sustenance and prosperity. One would naturally suppose, therefore, that the study of rural life would be given much prominence in our elementary schools, and that every encouragement would be given the larger boys and girls who had passed through the usual grades of the rural schools, to equip themselves still further for their life work. As a matter of fact, however, the studies in most rural schools are quite similar to those carried on in town and city schools, while the high schools give practically no attention to the requirements of rural life. Their courses are admirably adapted to those desirous of becoming teachers and university students, but they fail to meet the needs of the great majority of the pupils passing through the public schools. The high schools practically compel every student to "face about and march" for the Normal School or College, for the course of studies gives no alternative. (Of late years Commercial courses are given in many high schools).

For some time, then, thoughtful people have felt that the studies in rural schools do not deal definitely enough with rural things and conditions. There is no longer any real doubt that such studies are valuable educationally, for the agricultural colleges have shown that these possess high cultural value as well as practical utility.

Owing to the constant changes in agricultural conditions which result from the new applications of knowledge, each individual citizen needs a higher degree of adaptability than was formerly the case. Professor Sadler says: "These changes in the

condition of life call for a new spirit in education from the earliest years upward. A vast body of new knowledge has to be brought into educational account. The old tradition has to be examined, readjusted to new needs, and in part discarded, new studies have to be introduced, and scientific thought has to be given to the training of the senses. Science has furnished an immense amount of usable information that has practically revolutionized the older methods of agriculture; and it is very important that the coming rural citizens should enter into the possession of this information with the ability to apply this new knowledge to practical ends, to bring together different portions of knowledge into new combinations, to realize quickly the bearing of new developments of knowledge upon customary ways of doing things and upon the probable demands for new kinds of service." Besides a trained intelligence, the rural citizen should have a sympathetic interest in the world of nature about him; he should see something of the beauty of the web of life, and understand that his physical welfare depends largely upon his obedience to the laws of nature that he has tried to grasp. More than this, the cultivators of the soil require training in organization and co-operation, for these spell success in agricultural as they do in other commercial lines.

For ages the farmer did not feel much need for co-operation; he required little beyond his own farm; he was self-contained. His earnings were small in spite of the hard work, and he had no desire to speculate, lest he lose his hard earned money. He became independent, but his independence prevented him from getting all he could from his land. He shunned co-operation in matters of common interest to all his neighbors. The products of his farm went to the market alone, very frequently in inconvenient and unattractive forms. Latterly, however, through the desire to have good roads, good local government, good schools and good churches, the spirit of co-operation is invading the communities.

Good rural schools, however, imply good teachers—teachers able "to articulate the country school closely and smoothly with the country home, the neighborhood and the country at large; only so can the instruction of the school take on the reality needed to make it vigorously and practically effective. The teachers should be able to utilize the local community life, its occupations, resources, organisations, traditions and customs, for the rural school."

But again back of this, properly prepared rural teachers must be trained at suitably equipped and suitably located normal schools. Our city normal schools have failed to a large

extent in the training of teachers for the special work of the country schools. These results are not due to the staff, but to the environment of the normal schools. The city is not a favorable place to study rural life, to gain that practical and scientific knowledge of farm life that is so essential to the teacher, or to get practice work in ungraded, one-master, rural schools. City schools teach city life and the facts that go with city life."

There should, therefore, be a rural normal school for the special training of rural teachers; and probably such a school could do the most effective work if it were attached to an agricultural college. This opinion coincides with that expressed in the recent report of the Committee on Industrial and Technical Education, appointed by the Legislature of Massachusetts and presided over by Dr. Carrol D. Wright, the noted educationist and economist. This report recommends the establishment of a normal school for the training of teachers for the rural schools at the State Agricultural College.

Many efforts have been made to improve our rural schools. The task is more difficult to-day than it has been for centuries on account of the new conditions that have arisen as a result of the recent scientific investigations in agriculture and the rivalry of the great agricultural countries for the best markets.

The ideal system of schools for the rural districts would appear to be: (1) One or two agricultural high schools in each county, each equipped with one or more teachers on its staff trained at an agricultural college, acquainted with the practical side of agriculture, and able to use the farm in connection with the high school to demonstrate in a practical way the best scientific principles and methods advocated by the Experiment Stations. These schools would act as feeders for the Agricultural College of the province. (2) A good consolidated school for each township, where the first year of the high school would be connected in course with the elementary grade work. (3) Good rural schools where nature study would form the basis of the school effort, as in the lower grades of the consolidated school. This secondary course would be adapted to the needs of the larger boys and girls, who spend most of their time on the farm, but who would be willing to spend two or three months each year in a study of the activities of the district for the purpose of bettering their knowledge of farm processes, and thus gaining power for service.

But such a system of rural schools cannot be established without the hearty support of the farmers themselves, for it means increased taxes. They must first be shown the value of education, as applied to the various branches of agricultural

industry, in making for increased profits, and more comfortable living. To this end many agencies have been in operation during the last ten years. First and foremost of these agencies is the Ontario Agricultural College. The speaker here referred at length to the great work this institution was doing not only for the farmers' boys and girls, but also for the farmers themselves through the Experimental Union, the Special Short Courses, The Farmers' Institutes, and the other allied associations aided by the Government of Ontario and the Department of Agriculture at Ottawa.

The second agency, the speaker said, was the wonderful series of object-lessons carried out by Dr. Jas. W. Robertson, as Commissioner of Agriculture for Canada. These were illustration experiments on a large scale to show the value of the application of intelligent labour (education) to the agricultural industries. Dr. Robertson's policy in all his efforts to make the farms more productive was simply to break the way for new and vast interests, and then to withdraw in favour of the spirit of self-help that they had aroused and directed. It aimed to help the farmer to make more of himself and of his farm through education.

While directing this movement of the application of science, organization and co-operation to farm labour, Dr. Robertson was not forgetful of the boys and girls of the farm. He was planning a kind of training in which the duties and joys of the farm would be emphasized. For example, to show the importance of the planting of selected seed in the improvement of crops, and to create an interest in this matter among the boys and girls, he established a seed grain competition, the results of which are familiar to most persons. In this work he secured the co-operation and financial help of Sir William C. Macdonald. From this time forward these two men have planned and laboured together for the advancement of education.

The educational work in seed selection formed in reality one phase of the Manual Training Movement organized by Dr. Robertson and Sir William Macdonald, whereby Manual Training was introduced into the schools of the chief cities and towns of Canada, and its value as an educational subject was recognized both by the educational authorities and by the people.

Encouraged by the great interest shown in this work, they planned what is now known as the Macdonald Rural Schools Movement. It had a three-fold object: (*a*) To show the value of consolidation of schools by the establishment of a rural consolidated school in each of the eastern provinces, well equipped with a competent staff for teaching, along with the ordinary

subjects, Manual Training, Domestic Science and Nature Study, where school garden work is emphasized. (*b*) To train teachers in the new subjects of Manual Training, Domestic Science and Nature Study. (*c*) To provide school gardens at a group of five schools in each province, with a travelling instructor in charge of each group, spending one day each week at each of the schools of the group, guiding both teacher and pupils.

The term of three years during which the Fund agreed to maintain these agencies is now nearly over, and we are able to see the results, as it were, from a distance. These results are: (*a*) A great interest has been aroused throughout Canada in the matter of education, more especially rural education, and more attention is now being given to the improvement of school grounds and buildings, to the better remuneration of teachers, and to the courses of study. (*b*) The leaders of education feel that they have now a strong backing of public opinion for the improvements they have in mind. (*c*) Nature Study, with the school garden, Manual Training and Domestic Science are subjects that vitalize and give interest to the work of the school. They relate the school to the home, remove the tendency to restlessness that prevails to an alarming extent in rural communities, and furnish during the early years of the child "exercises through which he acquires unconsciously the taste and capacity for work," and also the mental attitude of enquiry into the meanings of things in the presence of the facts. (*d*) The rural people can be brought to appreciate good education whenever good illustrations are brought to their attention, and they show that they appreciate it by increasing their school tax to maintain the new school. The rate-payers of the consolidated schools have seen visions during the last three years that disturb contentment, and they will never be satisfied again with the old, poorly equipped school of preconsolidation days. For example, the average daily attendance has been *trebled* at the Consolidated School, Kingston, N.B., and *doubled* at the Guelph School.

The people naturally ask if by two men's work so much good can be done, how much good can the State do with its resources behind it?

The Macdonald Movement is, in other words, a grand demonstration of the application of improved methods of education which our most advanced educators have devised, but which the state was unwilling to adopt into its educational system on account of lack of public support. It is the forerunner of the system of rural education supported by public funds, that prepares the child for complete living on the farm.

Finally came the establishment of the Macdonald College

at Ste. Anne de Bellevue, near Montreal, an institution which will bring together the scattered agencies making for an educated rural people into a great educational centre. It will include (*a*) an Agricultural College, carrying on work similar to the one at Guelph, where young men will receive instruction in all branches of agriculture; (*b*) a Household Science College where young women will get instruction in those subjects that make for better home making, and (*c*) a College of Education for the training of teachers, especially for rural schools. Agencies will be put in operation for the extension of the work to all parts of Quebec, and perhaps to the other provinces as well, so as to reach as many of the rural people as possible. The 560 acres of land and the magnificent group of buildings now nearing completion, will cost over a million and a half; and an Endowment Fund of two millions has been provided for maintenance, so that it will be self sustaining for all time to come.

The Macdonald College will open its doors to students in September next, when the work of instruction will begin. Tuition will be free to all students from Quebec, and no distinction will be made for language or creed; all will be made equally welcome.

---

## PROGRAMME OF EXCURSIONS.

April 20—Rockliffe.
27—Beechwood.
May 4—Blueberry Point.
11—Leamy's Lake.
18—Beaver Meadow.
25—Victoria Park and Experimental Farm.
June 1—General Excursion to Chelsea.

The time and place of meeting will, for all but the general excursion, be 3 p.m. at the point on the electric railway, nearest the places mentioned above.

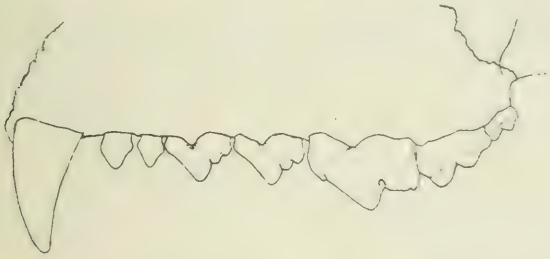
# THE OTTAWA NATURALIST

VOL. XXI. OTTAWA, MAY, 1907 No. 2

## NOTE ON THE OCCURRENCE OF A SUPERNUMERARY TOOTH IN A DOG.*

By LAWRENCE M. LAMBE, F.G.S., F.R.S.C., Geological Survey of Canada.

Last summer whilst engaged in field work in the vicinity of Kamloops Lake, B.C., the writer found, near the mouth of Tranquille River, the skull of a dog, probably that of a collie, that is of some interest. In this skull the teeth of the mandible appear to be normal, but in the upper jaw a supernumerary first premolar is present on both sides.



½ Natural size

Between the second premolar and the canine (see the above figure) are two small, single-rooted teeth with simple conical crowns. Of these the one next behind the canine, and separated from it by a space measuring 3.3 mm., is apparently the normal first premolar. Between this tooth and the second premolar is the tooth considered to be the supernumerary one. It is slightly smaller than the first premolar, and its posterior edge is less sloping; in other words, its crown, in side view, is more bilaterally symmetrical, a point possibly not sufficiently accentuated in the figure. It almost entirely occupies the interval between the first and second premolar, touching the latter but leaving a very narrow space between it and the former. The other teeth in the upper jaw, including the incisors, are apparently quite normal.

In comparison with the skull of a white wolf (*Canis lupus occidentalis* var. *albus*) from Fullerton, Hudson Bay, the Tranquille specimen is slightly shorter with almost the same

*Communicated by permission of the Acting Director of the Geological Survey of Canada.

breadth as measured across the zygomatic arches; its teeth, however, are decidedly less robust. Whilst in the wolf skull the maxillary teeth (canine, premolars and molars) occupy a space of 103 mm., a like measurement in the Tranquille skull gives 91 mm. It is thought that the latter skull is that of a collie. Mr. W. Fortune, the owner of one of the ranches, of which there are two at Tranquille, informs the writer that he has had a number of Scotch collies of which several have died during the past few years.

In the wolf skull the first premolar has a small interval (about 1 mm.) between it and the second premolar with a wider space (about 2 mm.) separating it from the canine. Here the first premolar has the same proportions as the anterior tooth in the supposed collie skull, but is larger, with a similarly sloping posterior edge.

The collie shows its affinity to the wolf in its narrow skull and lengthened muzzle. It would be interesting to have records of the occurrence of extra teeth, in breeds of dogs having elongated skulls, and in the wolf if such teeth occur, as they probably do, in this animal. Supernumerary upper first premolars are known in the domestic cat.

MEASUREMENTS OF SKULLS.

| | Dog. | Wolf. |
|---|---|---|
| Length of skull, occipital condyle to anterior end of premaxilla | 210 mm. | 216 mm. |
| Breadth of cranium at greatest constriction behind the orbits | 43 | 43 |
| Breadth of same at greatest expansion below squamoso-parietal suture | 65 | 70 |
| Breadth of frontals at postorbital processes | 63.5 | 55.5 |
| Breadth of skull at alveolar border above second premolar | 41 | 42 |
| Breadth across zygomatic arches | 118 | 120 |
| Length of nasals | 88 | 87 |
| Length of premolar-molar series | 77 | 88 |
| Antero-posterior diameter of crown of upper carnassial | 20 | 24.5 |
| Anterior transverse diameter of same | 10 | 14 |
| Antero-posterior diameter of crown of upper first premolar | 6.5 | 8 |

The upper teeth of the Tranquille skull are shown, in the figure accompanying this note, three-fourths the natural size.

The writer is indebted to Mr. Andrew Halkett, Naturalist and Curator, Fisheries Museum, Ottawa, for the loan of the skull of the white wolf above mentioned.

# HOW THE SEEDS OF PLANTS ARE SPREAD IN NATURE.

By Norman Griddle, Awerne, Man.

In the common natural objects about us there is an endless field for Nature Study. So vast indeed that the difficulty would be not in seeking a subject, but rather in selecting from the abundant material at hand one that is both interesting and instructive, and is at the same time not too difficult for the beginner to understand.

The remarkable though simple methods adopted by the different plants for the propagation of their kind, in so many cases very dissimilar, should be known to every one, and, for a Nature Study, form excellent subjects both for observation and deduction, to say nothing of the interest they might awaken and the pleasure they might give to any one making a study of the subject. In this paper I shall try to treat part of this subject under the above heading.

Before going into details it may be well to state for the benefit of the beginner, that every species of plant, however simple or complex its structure may be, is specially adapted for its advantage in the struggle for existence; and that however much one genus may vary from another in essential particulars, the object is always the same. Namely, to multiply to the utmost limit. A student, therefore, when examining a plant, should bear in mind that whatever the structure, it is for the plant's benefit, and that it has maintained the species in the struggle with other plants and with animals, for a number of centuries. There is in fact a reason for every detail.

## I. Seeds that are Carried by Wind.

Seeds under this heading always have attached to them some fluffy material to catch the wind, like the pappus of the dandelion, or they are winged like the seeds of maples and conifers. The common dandelion and other close allies offer simple objects for study, as some form can be found nearly everywhere. The seeds of this plant, as the pappus shows, depend almost entirely on the wind for transportation and migration. In many instances the pappus undoubtedly enables them to travel several miles. There is, however, a condition that is absolutely necessary. The plant will not let the seeds go in damp or wet weather, and if the air becomes damp while the seeds are travelling, they soon drop to the ground. This applies to all the fluffy seeds and in a lesser extent to the winged kinds. The

willows and poplars provide good examples of fluffy seeds, but though the air on some occasions seems almost choked with little pieces of fluff—all of which contain one or more seeds—it will be observed that a very small percentage indeed alight on a suitable place for the growth of the seedlings, and that a still smaller percentage of these latter ever attain the size of their parents. Yet who can find a moist place in nature, where the conditions are favourable, that does not contain willows? Showing that the object for which these countless millions of seeds went forth has been accomplished.

The milk-weeds, willow-herbs, bull-rushes and many anemones are examples of this class of seeds. While ashes, maples, conifers and docks are examples of the winged kinds. There are some interesting details in this latter class for the student to work out, which may be discovered by throwing up into the air a few of the seeds on a moderately windy day.

## II. Seeds That are Scattered by 'Tumbling' Plants.

This is a class of plants that depends upon the wind for the locomotive power to take their seeds about the country. The best known examples are commonly known as 'tumble weeds.' These plants usually grow in the shape of a ball with their branches rather tightly packed together. As soon as their seeds are ripe they rot or break off close to the ground, and with the first strong wind are sent rolling over the country, scattering their seeds as they go. In the West where there are large plains it is a common and interesting sight to see thousands of these plants sweeping over the prairie, looking in the distance like huge herds of cattle or sheep. In such places the country for miles is sown with the seeds of these plants, especially *Amarantus Albus*, Persian thistle, tumbling mustard, *Cycloloma*, etc. Several grasses are also examples of this class, and many others will occur to the reader.

## III. Seeds that are Scattered by the Wind.

We now come to a class of plants which though dependent on the wind to a large extent for their spread, yet have neither downy nor winged seeds nor the power of tumbling. These are plants that have the seed-capsules pointing upwards and which open at the top. Many of these are so constructed that a strong wind is required to shake the seeds out; they are then not only scattered by the swing of the plant, but are caught up by the wind as they are thrown out and are borne some distance away.

In a number of these plants the seed-capsules split at the top and form a toothed edge. The night-flowering catchfly and other members of the allied genera, *Silene* and *Lychnis*, are examples of this class. The teeth, although in appearance looking as if they were merely the result of the top splitting open to let out the seeds, in reality also answer quite another purpose, namely, to scatter the seeds as they are shaken out, so that they may not fall too closely together. A rather more complicated example to gain the same end is shown in the seed pod or capsule of the common garden poppy. Here there is a cap to prevent the seeds from being shaken out too fast, and small holes round the sides just below the cap. In fact, it is a natural sifter from which the seeds are shaken out a few at a time, usually by the wind. Indeed the only method whereby the seeds can get out is by the plant being shaken or broken down, and this latter alternative would be only accidental and therefore does not need to be taken into consideration here.

There are a great many other modifications of this group which will suggest themselves to the observant student. A large number of seeds are, however, scattered by the wind that are only partly modified for the purpose, and with some plants it is difficult to tell whether they are in any way adapted for that special purpose.

## IV. Seeds that are Spread by Clinging and Sticking.

Seeds of this group depend principally upon mammals for their distribution. They contain among their best known forms those seeds which are commonly called 'burs,' though several grasses are also included in the group.

'Burs' are known to most people, especially to owners of thick haired dogs. Yet how few consider why they cling to almost any thing that comes in contact with them!

To a Nature student the reason is at once apparent. They have become adapted to clinging so that they may be carried to new localities and so become spread by degrees over wide areas.

Examples of this class of seeds or seed pods will be found everywhere. The different blue-burs, cockle-burs, bur marigolds and wild liquorice (*Glycyrrhiza*) are common examples, but there are many more, some consisting of a single seed, while in others the whole pod with several seeds is carried.

A different method of distribution is found in seeds which

are also carried by animals. These when wetted become sticky. The moisture causes a coat of mucilage to form all round them, so that they stick to any thing that touches them, and as they dry they become securely gummed to the object, and may then be carried for many days before becoming dislodged. An example of this class will be found in pepper-grass and shepherd's purse, as well as in several others of the cress family.

### V. Seeds that are Spread by Propulsion and Seeds that are Spread by Trailing and Climbing Plants.

In this class are to be found some rather complicated methods of seed distribution. In the case of the violets, the pod bursts open when the seeds are ripe like a great many other seed pods, but in this case the seeds remain in the separate valves or partitions until they are expelled slowly by the drying and contracting of the sides of the valve, which forces the seeds out by squeezing so that in some cases they are thrown several feet away. Anyone who has collected pansy seeds should have noticed this.

An interesting example of a plant throwing its seeds, as if from a sling, is shown by the common cranesbill, though the method here employed is quite different from the last.

Another interesting plant is the jewel-weed, or touch-me-not (*Impatiens*). To thoroughly appreciate the methods employed by this plant in scattering its seeds, I would suggest the readers trying to collect some seeds. When, if a beginner, I am sure he or she will be surprised at the rapidity with which the seeds vanish at the slightest touch, just as if they knew one was after them.

The peas and beans are also examples of this class of plants, which by the rapid curling up of the sides of the pod when dry, part of the seeds are thrown some distance away. Many other examples of plants which have special ways of propelling their seeds will be found in any district if looked for.

The peas and beans also come under the class of plants that spread their seeds by trailing and climbing. Perhaps the best examples of these are members of the gourd family, melons, cucumbers, etc., the seeds of which under natural conditions, by being left where the fruit ripens, would be spread over an area of several feet. Convolvuluses and other climbing plants will also drop their seeds in many cases some distance from the parent plant, but as these plants prefer some sort of brush to climb up,

they will seldom drop seeds outside of such places, so that they nearly always have something to climb.

### VI. Seeds that attract and are Spread by Birds.

Who has not noticed the brilliantly colored berries on many a shrub and tree? And who has not watched the birds eating them? But ask the average person why the fruit is brightly colored, and probably not one in twenty will give the correct answer. Yet, as with the 'burs,' the reason is at once apparent. Fruits of this nature are brightly colored to attract birds, and for no other reason. This is also why so many berries remain on the trees in winter time. The birds eat the fruit; but the seeds are so constructed that many of them are not damaged, and they are eventually dropped where they have a chance of growing, in most cases far removed from their parents and brethren. In this way the species is spread. This of course does not apply so much to cultivated fruits, which have been altered and improved by man. Strawberries, raspberries, cherries, mountain ash, and practically all the other small berries that are brightly colored, can be used as examples of this method of seed distribution. Seeds are also carried by sticking to the muddy feet of birds and animals.

Many plants retain their seeds until the winter time, which are then drifted along with the snow, in some cases several miles. Small mammals and birds also carry many seeds to store them up as food for winter use. Large numbers of these are lost and if the situation is favourable they grow.

Many seeds are only partly developed for certain methods of migration, and in some cases a few plants will be found to bear two distinct forms of seeds. An example of this occurs in Russian pig-weed (*Axyris amarantoides*), some of the seeds of which are winged while others are not.

A number of aquatic plants and plants growing near water, have seeds well adapted to water migration, the seeds or seed capsule floating, and in still water are often drifted long distances by the wind, or when in running water are carried along with the current. A number of other seeds not specially adapted for this purpose are also accidentally carried by running water, especially when there are floods.

Many details and variations will be found by the Nature student to supplement the above methods of migration among seeds, the study of which should be a stimulus both to observation and deduction—the faculties that Nature Study specially aims at developing.

## HOW TO MAKE A BIRD SANCTUARY ANYWHERE.

BY C. de BLOIS GREEN.

Birds have their own little quarrels and struggles all the time, but these don't matter a bit if only you can keep down the vermin; and by that I mean keep hawks and the largest owls scarce, crows and magpies scarcer still, skunks and pet cats about as scarce as the megalosaurus, and squirrels scarcer than anything which Nature has yet invented. Under these conditions the little jealousies and quarrels amongst themselves will only lead to enough tragedies to give the birds a wholesome stimulus in selecting their nesting sites wisely and in watching over the eggs and young. Ordinary care may be a nuisance, but birds don't seem to mind that. I remember working on a hillside near Okanagan Lake in April last year. Two white-headed eagles were building, or rather patching up their nest, and I had that nest commanded by my transit telescope nearly all day and every day—I mean I was seldom where I could not turn it on and take a look. The second day they finished and went off on the hunt, next day I saw a white head on the nest. First egg, no doubt, thought I; now you can go off on another hunt till tomorrow, but not much; when that egg was laid, ordinary care put in its appearance and the old hen spent the balance of the day in flying north twenty chains, then south twenty chains (a slight flip of the wings gave her a close look at the egg). Thence south twenty chains, thence north twenty chains (sight of that egg, looks all right). Thence north twenty chains, thence south twenty chains (egg again), and so on all day without a halt. Ordinary care seemed to me a bit overdone in this case, for I haven't yet found out what possible danger that egg was in. No common ordinary mortal baby was ever more closely watched. The old bird must have known she hadn't left any pin sticking in its leg, did she expect it to wake up and shriek for its bottle every minute? The old birds had picked out for their nesting-place a tree four miles from anywhere, and six feet through at the base, without limbs for 50 feet. I stood at the foot of the tree twice later and could not think of any way to get those eggs. I certainly think she overdid it. However, perhaps, even she is afraid of crows. But every bird is not a white-headed eagle, some are humming-birds, and from what I can see, any relaxation or ordinary care leads to trouble for most small birds. Apart from the vermin, which is always hunting them, there is the next-door neighbor who covets come part of the house; while the hen kingbird sits on her nearly hatched eggs, two cedar birds may be as busy as possible dragging out the bottom of her nest to build

their own with, and unless the old man comes home pretty often, his hen might need a new nest, and perhaps new legs too, for I have seen two cedar birds pull so hard on the loose strings in the bottom of a nest that they both swung to and fro, hanging free in the air. Young birds with their first nest have a good deal to learn. They have "inherited instinct" in large quantities, but the longer they live the more they learn, and in that we have no advantage ourselves. For instance, I never knew till last year that a pair of Parkman's wrens might, through jealousy on their part and a little want of ordinary care on the other side, destroy nest after nest of their neighbours. On our verandah the wrens certainly were the ancient Britons, they found the place uninhabited and they unfurled their flag. I didn't notice the skull and cross bones on it, but welcomed them with open arms. I am bound to say they were careful to keep away from open arms but they got tame enough to go about all their little affairs and pay no attention to the big two-legged incumbrances, who certainly did sometimes get in the way by keeping them off the back of a chair that would have been a good place to sit on for a minute and shriek with joy. Two years' sole possession is probably enough to make any wrens feel absolute lords and sole owners of a chosen nesting place. This may account for the anger of our wrens when the Saxons came over in the shape of two swallows, and built a house within ten feet of their house. I don't think the Britons felt strong enough to fight in the open but they held much counsel in the dark, and I noticed that those young Saxons had a hard time in feathering their nest. They carried feathers from all over British Columbia without filling the nest; for, what the wrens could not use themselves, I think they sold or gave away to cedar birds, kingbirds, yellow-throats, etc., in fact, to any bird in need. Finally, the swallows decided that it took years of experience to feather a nest, and they laid four eggs on such material as was left. This so upset the wrens that they were at a loss what to do for some time. I know this because I was laid up sick on the verandah, and they had several chances of revenge which they did not take. There must have been a thorough discussion of the whole case about the time the swallows' eggs were three days incubated. For several days the swallows had never been both absent together, as one came in the other went out, and so on all day, in from five to ten minute intervals. One day, however, this care was relaxed for a few minutes; I suppose the hen met a friend and began some discussion as to how feathers were to be worn or not worn, and overstayed her time; then the old man having as much patience as most of us would have if we had to help with the incubating,

went off in a rage to hunt her up. In a moment the opportunity those wrens had been days in waiting for came and before I knew what was going on, the four swallows' eggs were lying on the verandah floor and a most delighted wren was standing on the edge of the nest with his head on one side looking down at them.

I was so sorry for the young swallows when they came home and talked it over that I went off to the nearest Traill's flycatcher's nest and divided up, giving my swallows two nearly hatched eggs. The next day the same thing happened again, showing that the wrens had now got an idea and were going to watch closely enough to carry it out at a moment's notice. I began to be afraid the swallows would think the place unlucky if they lost their first family, so I set out at once, and, to make quite sure this time, I gave them a nearly hatched kingbird's egg. This they hatched before either of them had forgotten to go home in time, in fact it hatched within a few hours.

This was rough on the young kingbird, and on the young couple too, for the only idea of the latter was to get flies, and lots of flies, and more flies, and to cram them down the throat of the young bird and also to be as quick as possible about it.

The young kingbird grew as fast as possible; but his appetite never quite satisfied the supposed parents. I've seen them hold a consultation as to its loss of appetite (the thing had been gorging incessantly for five hours). Then one swallow would poke the baby up into a sitting posture and pry open the beak while the other watched his chance to cram down another daddy longlegs. This affair ended, as far as I could see, in absolute disgust on both sides; as soon as the kingbird was able to leave, it left; it didn't sit in a long row on the nearest tree while the swallows fed it in the sun. And the swallows were apparently so much annoyed about it that they migrated without waiting for autumn. If they come back next year I may let you know what kind of birds they rear. Shall I make it wrens or eagles!

## REMARKABLY EARLY ARRIVAL OF THE FIRST MIGRANTS OF THIS SEASON.

By Rev. G. Eifrig.

The first Spring migrants among birds have come here earlier than usual. That is rather remarkable, when we consider that climatic conditions in February were severer than in most years, and that there was nothing especially tempting for birds here in March. The first robins and bluebirds looked and sounded strangely out of tune with the snow-covered fields and city-lots, and the prevailing ice and frost of the second half of March and the first half of April. What is the reason for this unusually early arrival, when there was so little here to tempt them? In my opinion it is the following: During the first half of March a wave of phenomenally warm or even hot weather struck that part of the United States which is in the latitude of Washington, D.C., New York, and westward to Chicago. The thermometer is reported at Washington to have climbed up as far as 92°, showing the highest temperature ever registered there for that part of the year, with perhaps one exception. Previous to this hot spell there would already be a great number of birds in those regions, their numerous permanent residents and the thousands of winter residents from Canada, e.g., the juncos, tree sparrows, song sparrows, etc. Now this warm wave would have the effect of attracting further untold numbers of migrants from further south, which in the normal course of events would have begun their northward move somewhat later. This must have caused a great congestion in the bird life of that section, which in plant and insect life was also not yet sufficiently advanced to support this teeming bird life. This would, in my opinion, have the effect of inducing the hardiest of the northward migrants, those who would have gone northward first at any rate, to leave somewhat earlier than usual. And no doubt, the song sparrows, bluebirds and robins which came here first this year, were again in their class, in their respective species, the pioneers, the leaders, the most hardy and intrepid ones, which would at the same time be able to withstand adverse conditions most successfully. And that some of them have to suffer more or less for their bravery and pluck, there can be no doubt. Some probably, when they found weather conditions so uncongenial here, promptly returned to points further south. Thus I saw a flock of about 50 tree swallows merrily flying over the Rideau River, then full of ice, at Cumming's Bridge at 2 o'clock in the afternoon, on March 30th. Two hours later not a one was there, and I have seen no more since. And now there has been a lull in the migration for about two weeks; few, if any, new species having come in addi-

tion to the first arrivals, only the numbers of those already here must have been slightly augmented. Another curious fact in the migration of this year is, that, while the purple finch was extremely abundant last year at this time, in and out of the city, I have not seen one so far this season, nor have I heard of others having seen them. There are always surprises in store for the observers of birds, especially during their migrations.

Appended is a list of birds that have come here so far, and the date of their arrival, together with lists of 1906 and 1905, for comparison's sake. It must be remembered, however, that last year's migration was unusually late; that of 1905, however, normal. From this latter list it will be seen that the first comers this season were from one to three days earlier than usual, some even more. It must also be remembered that the main part of the spring migration falls into May, when the countless hosts of the warblers, in all their variety, liveliness and beauty, come; also the thrushes, vireos, swallows, many of the finches, kinglets, etc. Then new pleasures await the observer at every turn. It is to be hoped that many members of the Field Naturalists' Club may take part in observing and recording the May migrations of this year, and send in their records of species seen and *positively* identified, together with date and place, to the writer. Here is the list so far:—

| | 1907 | 1906 | 1905 |
|---|---|---|---|
| Prairie Horned Lark | Feb. 10 (*a*) | Feb. 20 | Feb. 28 (*b*) |
| Redpoll (*c*) | Feb. 18 | ——— | ——— |
| Crow (*d*) | Mar. 2 | Mar. 9 | Feb. 18 |
| Song Sparrow | Mar. 13 | Apr. 2 | Mar. 18 |
| Blue Heron | Mar. 17 (*e*) | Apr. 5 | Apr. 27 |
| Robin | Mar. 16 | Mar. 31 | Mar. 19 |
| Bluebird | Mar. 21 | Apr. 3 | Mar. 24 |
| Cowbird | Mar. 21 | Apr. 8 | Mar. 29 |
| Bronzed Grackle, Blackbird | Mar. 23 | Apr. 2 | Mar. 27 |
| Red-winged Blackbird | Mar. 23 | Apr. 2 | Mar. 24 |
| Tree Sparrow | Mar. 23 | Apr. 9 | Mar. 24 |
| Meadowlark | Mar. 23 | Apr. 5 | Apr. 3 |
| Shrike, Butcherbird | Mar. 25 | Apr. 16 | Mar. 30 |
| Marsh Hawk | Mar. 25 | Apr. 12 | Apr. 1 |
| Junco, Snowbird | Mar. 25 | Apr. 6 | Mar. 23 |
| Golden-eye, Whistler (duck) | Mar. 26 | Mar. 29 | ——— |
| Flicker, Yellowhammer | Mar. 26 | Apr. 16 | Apr. 10 |
| Winter Wren | Mar. 26 | Apr. 18 | Apr. 17 |
| Golden-crowned Kinglet | Mar. 26 | Apr. 14 | Apr. 8 |
| Killdeer | Mar. 26 | Apr. 16 | Mar. 28 |
| Tree Swallow | Mar. 26 | Apr. 8 | Apr. 3 |

| | 1907 | 1906 | 1905 |
|---|---|---|---|
| Phoebe | Mar. 26 | Apr. 9 | Apr. 8 |
| Herring Gull | Mar. 30 | Apr. 3 | Apr. 10 |
| Sparrow Hawk | Mar. 30 | Apr. 7 | Apr. 18 |
| Savanna Sparrow | Mar. 31 | Apr. 15 | Apr. 11 |
| Vesper Sparrow | Apr. 1 | Apr. 15 | Apr. 12 |
| Brown Creeper | Apr. 2 | Apr. 15 | Mar. 30 |
| Chipping Sparrow | Apr. 3 (*f*) | Apr. 15 | Apr. 12 |
| Kingfisher | Apr. 13 | Apr. 16 | Apr. 8 |

(a) This is an approximate date from the rifle range. The keeper is positive that they were there the first week in February. 1800 sheep had been pastured there all winter.

(b) In more favorable places it probably would have been seen earlier.

(c) There have been unusually many great swing bands of these around the city in March and April.

(d) A few crows remain here all winter, in the neighborhood of slaughter houses, so it is hard to say, whether any seen before March are migrants or residents.

(e) Recorded at Germanicus, Renfrew Co.

(f) Recorded at Germanicus, Renfrew Co., which is more northerly than Ottawa.

*Ottawa, April 22nd*, 1907

## COYOTE AND BADGER.

During the progress of my survey in southern Alberta, I noticed on two occasions a badger and a coyote travelling in company. The same thing was observed and reported by the men who did my mounding on three different occasions, all of which were in different localities.

The men reported having seen the animals travelling in company in Tp. 1, R. 13, W. 4th Mer. The first time that I saw them together was in Tp. 6, R. 17, and the second time in Tp. 7, R. 17, W. 4th. This last time I had the best view. Seated one day eating our noon lunch, I noticed two animals coming towards us and drew the attention of my men to the fact. We remained perfectly quiet so that they came within 20 to 30 feet of us before seeing that we were so near. The coyote travelled ahead, and the badger followed along as fast as he could, right at the heels of the coyote.

I could see no reason nor could I explain it in any way satisfactory to myself, and although I asked several people in the West about it, the occurrence is still a mystery to me.

Listowel, Ont., March 20, 1907.

A. H. HAWKINS.

## LIST OF PLANTS COLLECTED ON THE PEEL RIVER IN 1906 BY MR. CHARLES CAMSELL.

*Papaver nudicaule*, L., Braine Creek.
*Lupinus arcticus*, Wats., Stewart River.
*Myosotis alpestris*, Koch., Bear Creek.
*Echinospermum deflexum*, Lehm., Bear Creek.
*Pyrola rotundifolia*, L. var. *pumila* Hook., Beaver River.
*Primula Mistassinica*, Michx., Beaver River.
*Pinguicula vulgaris*, L., Beaver River.
*Phlox Richardsonii*, Hook., Wind River.
*Cypripedium guttatum*, Swartz., Hungry Creek.
*Linum Lewisii*, Pursh., Wind River.
*Dryas octopetala*, L., Beaver River.
*Epilobium latifolium*, L., Wind River.
*Hedysarum Mackenzii*, Richards, Wind River.
*Potentilla fruticosa*, L., Beaver River.

## WILSON'S PHALAROPE.*

On June 9th, 1885, a nest containing three eggs of the above bird was found on the south bank of the Grand River a half mile below Dunnville, Haldimand Co., Ontario. As the nest and eggs were strange and neither parent bird was present it was determined to leave it until the next morning and to visit it again in the hope that one or both parents would be at home. On the morning of the 10th a second visit was made when the male bird flew off the nest and was shot. When the nest was examined I was disgusted to find that two of the three eggs were hatched. The young birds were tiny bits of down, stripped and sotted with dark brown on a buff ground color. The egg was 1¼ inch in length by ⅞ in width and very dark in color, in fact the large end was covered with two dark brown colors, while the rest of the shell was of a dark buff color spotted with dark brown.

The nest was situated on the bank of the river a few feet from its edge, near a tall tussock of marsh grass and was fairly well formed and made of a little moss and weeds such as grow in that locality. A depression seemed to have first been made in the soft marsh soil which was then lined with moss and fine grass.

The female bird was not seen. The rest of the family, as taken, are now in my collection.

G. A. MACCALLUM.

*See The Ottawa Naturalist, Vol. XV, page 127, where this nest is credited to the buff-breasted sandpiper.—EDITOR

## ENTOMOLOGICAL BRANCH.

Meeting No. 5 was held at Dr. Fletcher's rooms on the evening of March 5th.

Mr. Gibson showed a box of specimens of *Pseudohazis eglanterina* and *shastaensis*, and also *Hemileuca maia* with its variety *lucina* from Manitoba. He also gave an account of these insects and the method of their occurrence drawn from the literature of the subject. Inflated larvae were also exhibited.

Mr. Baldwin exhibited a pocket box of insects collected during the past summer. All the species submitted were identified.

Mr. Halkett showed a specimen of a blood worm, the larvae of one of the *Chironomidæ* which had caused some excitement when it came through one of the taps of the water supply in one of the Government buildings.

Mr. Nelles, of the Alaska Coast Strip Survey Staff, exhibited a collection of very interesting and beautiful photographs taken during the past summer while in the field.

Mr. Harrington showed a box of some of the rarer and more interesting flies of the locality, at the same time reporting on the progress he had made in getting the Ottawa species identified. He also showed some very handsome foreign beetles. Some of these he had collected in Japan and others had been received from European correspondents.

Mr. Metcalfe exhibited a box of Ottawa Heteroptera and pointed out the differences between some of the closely allied species.

Mr. Young showed a beautiful case illustrating the life-history of *Limenitis disippus* with its food plant. A remarkable specimen of a willow twig showing eight of the larval hybernacula on successive leaves was included in this case. A box of notodontian larvae of the old genus *Cerura*, was also exhibited.

Dr. Fletcher spoke of the Apple Maggot, Plum Curculio, and Asparagus Beetle and showed preserved specimens mounted in a special way for exhibition at meetings.—J. F.

## MEETINGS OF THE COUNCIL.

The first meeting of the new Council was held in the library of the Normal School, March 25th. The members present were: The President, Misses Matthews, Ritchie and Jackson, and Messrs. Attwood, Halkett, Eifrig, Gibson, Clarke, Macoun, Lemieux and Gallup. Six new members were proposed and elected. A communication was read from Mr. Charles Pollard, Secretary of the Wild Flower Preservation Society of America, offering to lecture here under the auspices of the Club. A committee was appointed to make arrangements for this lecture. A proposal from the University of California to exchange the publications of the University for THE OTTAWA NATURALIST was accepted.

The Publishing, Excursion and Soirée Committees, leaders in the various branches of the Club's work and an Editor and Associate Editors were elected. A noteworthy characteristic of the new Council is the number of new members, all of whom have entered enthusiastically upon the work, and a successful Club year is anticipated.

## CORRESPONDENCE.

THE EDITOR, THE OTTAWA NATURALIST,

Dear Sir:—In your February issue a remarkable circumstance is recorded by Mr. Geo. A. Dunlop, adding a new accident to the list of those which may befall a ruffed grouse.

This individual, apparently in sound health, was found with its tail feathers frozen into the ice crust, under a bush. In the winter they commonly sleep on the ground, entering snowdrifts only in the coldest weather. It is absolutely certain that its tail could not have been frozen down, had there not been at the place some frozen liquid. This may have been produced by a certain condition of the bird's bowels, or the sun's heat in such a sheltered spot may have melted the snow, so that it was wet when the bird went in, or finally, the bird's tail may have been wet when it went to bed, and a frosty night completed the dilemma.

This you will remember is an accident of a class which happen every year to the foxes in Alaska. They sit down on the wet ice, thereby casting a shadow over it. In 15 or 20 minutes the wet in the shadow has congealed, and the fox would be made prisoner but that he tears himself violently away, leaving much of his fur in the ice. The consequence is, that in the spring of the year all the blue foxes have their buttocks more or less denuded of fur. ERNEST THOMPSON SETON.

Cos Cob, Conn., March 22, 1907.

# THE OTTAWA NATURALIST

Vol. XXIII. OTTAWA, JUNE, 1907 No. 3

## CLIMATE IN RELATION TO HEALTH.*

By Peter H. Bryce, M.A., M.D., Chief Medical Officer, Interior Department, Ottawa.

Mr. Chairman and Ladies and Gentlemen:—

In order to comprehend the problem of climate in relation to health, we must for a moment consider the relation of the atmosphere to the human body. Herbert Spencer has defined life "as the concordance of a series of internal movements in correspondence with a series of external acts;" or, as the Spanish poet-scientist would put it, . . "Life is the harmonic rythm of the infinitude of individual cell-organisms of the body in consonance with the Mechanism of the Universe (Mechanica Cumica)."

Briefly stated, the oxygen of the air is *life* and upon its entrance into the system depends the functioning of the tissues and organs of the body. We respire 17 times in a minute normally, and inhale some 25 cubic inches at each inspiration, or in twenty-four hours some 11 metres of air, of which one-fifth is oxygen. In health this air enters by way of the nose, but in increased exercise by the mouth as well. It is evident, therefore, that normal inspiration depends upon healthy air passages; without them the chest becomes depressed and finally deformed. Mouth-breathing is abnormal and injurious since the air reaches the lungs too soon to be warmed, while in addition, its impurities revolt the mucous membrane directly instead of being filtered by the cilia of the nose. Indeed, physicians are now agreed that it is by the mouth that infections most commonly reach the system through the tonsils; while on the other hand, the air entering by the nostrils is filtered, warmed and moistened before reaching the delicate lung tissues. Assuming that this air is dry and cold, we find that it takes up in the air passages moisture to 92% of saturation, and is raised to 97° F. before being expired. The water thus abstracted from the body amounts to 7,000 grains, or 1 pound, in twenty-four hours. Moreover, Miquel has shown that air has as high as 70 living germs even in pure outer air per metre, and as many as 20,000 in the air of hospitals and other crowded buildings. Assume that the air inspired is in an impure, infected house atmosphere and we cannot fail to

*Address delivered at Normal School, Jan. 22nd, 1907.

see how the *bacilli* of tuberculosis reach the tissues. We thus see that it is in the foul, deoxidized air of tenements that we are to look for congested, catarrhal mucous membranes, and for infection reaching the mouth, through nasal catarrh making mouth-breathing inevitable. We thus have the double evils of imperfect nutrition from insufficient oxygen, and of the poisonous effects of infected air. These slum conditions, however bad they may be in southern cities, are relieved by the outdoor life possible even in winter, while in northern cities we have the impure air of houses with the abnormal dryness of furnace-heated houses, due to the great differences in temperature and moisture between indoor and outdoor air in the winter months. When it is realized, for instance, that in Ireland, with its small chilly cabins, heated only with turf fires, the deaths from diphtheria in 1893 were but 0.08 per 1,000, and in London 0.78, and that while the death-rate in all Scotland in 1892 was 2.3 per 1,000, that in the rural fishing villages with their cold and wet, was 1.7 per 1,000, it will be seen that the conditions of house atmospheres are the most potent influences of any single factor in climate. To give but a single Canadian example: I have found that in the beautiful foot-hill climate of our own Alberta, the death rate of some of the Indians on certain reservations, where they live in small, crowded and insanitary houses, reached last year as high as 80 per 1,000, largely due to consumption.

Manifestly then, the maintenance of cleanliness in houses, together with an abundance of warm air with sufficient moisture, is primarily of all conditions that upon which health in temperate climates depends.

*Carbonic Acid*—It has been already explained how oxygen obtains entrance to the tissues, and to what extent. In the tissues it is taken up by the red corpuscles through the thin lining membrane of the lungs, and by them carried to the tissues where it unites with their carbon to form carbonic acid. Some 1,400 grains, or 2 pounds of carbonic acid is given off by the lungs in twenty-four hours. Thus we see that oxygen burns up the wastes of the body to the extent of nearly 3 pounds given off daily, further increased one-third by active exercise. It need hardly be pointed out that this active life process produces heat, and that it goes on best and normally in the pure outdoor air, which on the plains and mountains is almost germ-free. If then, wastes are produced by this organic combustion and are thrown off by the lungs, skin and kidneys, it is apparent that the fuel thus burnt up demands that a fresh supply, in other words, food, be taken into the system. So we see how absolutely essential it is if we

wish not only to maintain health but also to reconstruct diseased tissues, that we have not only an abundant supply of pure oxygen, but also food to restore tissues, or to make new blood and more heat and energy.

*Humidity of the Atmosphere.*—It has already been stated that oxygen of the air is to nitrogen as 1 to 4 in volume. But we have in the atmosphere water as vapor in varying amounts. Normal air on a bright day in this climate contains about 70 to 75% of saturation with water vapour. All are aware how depressing a damp day is. We say the air is 'heavy,' but as a matter of fact the barometer shows it is lighter. This physical effect means simply that with excessive moisture the air breathed with each respiration has less of oxygen, and we are not then receiving enough to supply the demands of the body tissues, and so they are being over-loaded with effete matter. Moreover, the excessive air moisture prevents our bodies from throwing off body wastes by evaporation.

*Temperature of the Atmosphere.*—But there is yet another factor of importance in our climate which effects us, that is the coldness of the air. Remembering that air expands 1-273 part of its volume with every degree F. it is plain that air at zero is, as we may say, more condensed, that is every 15 cubic inches which we inhale contains more oxygen than at 90 degrees by about 25%. But air at zero holds less than 1 grain of moisture as vapor, so that cold air inhaled means increased chemical action in the tissues; more combustion, more wastes produced, more waste thrown off and more desire for food.

Regnault's Tables show air at 70 degrees to actually hold 7.992 grains of moisture, or 16 times as much as at zero; so that cold, dry air means that the body throws off by both respiration and evaporation much more moisture and with it more wastes from the body in solution. This same condition is attained in the high, dry climate of our western foot-hills, where with a relative humidity of only 50%, the amount of moisture actually cast off in twenty-four hours is, according to Dr. Denison, 25% more in twenty-four hours.

*Sunlight.*—But while the consumption of oxygen is greater in such climates, and the increased [illegible] off with moisture are likewise increased, we have further another influence in the effects of the direct sunlight on the plains and in our own climate on bright days. Much has of late been told us regarding the actinic rays of the sunlight, these being those at the farthest end of the spectrum, viz., the red and ultra violet. These rays

actually do penetrate the tissues and, like the Roentgen rays and radium, do produce actual changes in tissues. Such rays, we know, are obstructed and diffused by vapor and clouds, and in the summer, create with heat those conditions under which fungi, as rust and mildew, develop on plants and in houses.

*Influence of Altitude.*—One of the most remarkable effects of high altitudes, as in the Alps, is the notable increase of red corpuscles in the blood. When one goes quickly from say Vera Cruz in Mexico to Mexico City, at 7,300 feet of altitude, in 12 hours, he is conscious at once of exhaustion on the slightest exercise. The reason is that the 4,000,000 corpuscles per cubic centimetre are not normally capable of absorbing enough of oxygen to supply the needs of the tissues, hence there is actually an anoxydation. Now it is probable that the defective supply of oxygen which is rapidly overcome, say in a fortnight, through an increase of the corpuscles to 6,000,000, or more is due to the bright sunshine. Rapid metabolism or changes of tissue results, since to get enough of oxygen deeper and more frequent inspirations invariably and necessarily are the temporary effect.

Thus we have here again rapid reconstruction of tissue by increased demands for food, and the rapid increase of red corpuscles is insured, provided that exhaustion is prevented by temporary rest or slight exercise, and protection is insured against a loss of body heat by adequate clothing, with the very rapid fall of often 40 degrees of temperature within two hours as sunset approaches.

I have thus, as briefly as possible, indicated not only how air or oxygen enters the system and produces effects there, but have also shown how its normal constituents, oxygen and moisture, and its abnormal contents, disease germs, produce certain effects and how house atmospheres or excess of moisture, cold, sunshine, and altitude all play their parts for good or ill upon the human body. We have to deal now with actual climatic conditions as we find them in Canada, and to indicate some conclusions which seem to grow out of these.

Remembering that in tuberculosis we have a disease which yearly takes its toll of some 9,000 deaths in Canada, and realizing that all sanitarians call it essentially a house-disease, increasing directly with house density of population, we may properly study it in relation to climate and in this include house atmospheres or *artificial climates*. It will further be apparent that whatever climatic conditions influence this disease, influence probably equally other diseases.

The problem of lessening tuberculosis presents two factors;

first, its *prevention*, and second, its *cure*.

*Prevention of Tuberculosis.*—Assuming that tuberculosis does not exist in a family or in a house, it is plain that with cleanliness in the house, in its atmosphere, in the food and clothing, the disease cannot come there. Extend this to shops, street-cars, schools, etc., and it could not be generated there. But experience and scientific experiment both readily teach us that in our cities and towns, expectoration and coughing leave its germs in every public place. Nevertheless, it is well known that persons with healthy mucous membranes, if care is taken to destroy sputum and use handkerchiefs when coughing, may act as nurses for years in consumptive hospitals and yet not become infected. Clearly then, house, school and shop cleanliness are first essentials. But inasmuch as infected persons must be taught these facts, and those nursing them as well, it is apparent that education by the family physician, by the district nurse, by the school-teacher, and by public lectures is absolutely essential to prevent infection where the disease has once been present.

But from what has been said regarding the atmosphere of houses, as regards purity, moisture and heating, it is apparent that municipal provisions, with the assistance of charity workers, by which house construction, house sanitation and the number of persons to a certain air-space are regulated, must be strictly enforced. We thus see that the task is a large one, and one which we have as yet scarcely begun to cope with.

*Cure of Tuberculosis.*—But assuming that we have set all this in motion, we have yet to deal with the actual cases of disease. As all have observed, it is seldom that persons in rugged health take tuberculosis, and it is usually where the vital powers have been reduced by some acute disease, as pneumonia, typhoid or pleurisy, that naturally healthy persons are infected. The reason for this is plain: the germs do not enter the system ordinarily except by the respiratory tract, and obtain a lodgement only when its vitality is reduced. If, however, house air is infected, if it is abnormally dry, if its oxygen is lessened by over-crowding and non-ventilation, if catarrhs prevent normal breathing through the nose, if lack of exercise, lack of food and loss of rest occur, and all these too often *do* occur amongst the employees of city factories, shops and many homes, it is apparent that infection is almost inevitable. But having occurred, it is apparent that the only hope of preventing the progress of the disease is in removing the patients at once from the effects of such conditions.

*Home Treatment.*—Can treatment of tuberculosis be carried out at home? Yes, in many cases, if the patient be intelligent and willing to submit to regulations and friends are willing and able to provide the means. For the patient's sake, leaving out the public, it is apparent, however, that consumptives must not continue to work indoors. It may be hard to arrange, but a life is at stake. If then the patient remains at home, she may find light employment in rooms, bright and fresh, and hope for time and care to assist in recovery. But if, as is commonly the case, the disease is not diagnozed till fever is present, it is evident that active measures are demanded. At once then the patient may in a balcony on the south side of any house live in the pure condensed oxygen of our winter days, and exposed to the sunshine and wrapped in flannels and furs, breath such an amount of oxygen that reconstruction of tissue by increased food may be fairly expected to follow. If men engaged indoors become infected, then a similar rest cure till the fever is reduced and strength increased must be instituted, after which we may find it possible to engage in light work in the outer air, and recover health.

Sleeping in tents in the open is equally effective, and in doubled-walled tents I have had hundreds of persons, smallpox patients, live comfortably at 20° degrees below zero.

*Treatment in Sanatoria.*—It is evident, however, that for poor persons, removal from home surroundings for a time would be better, and hence within recent years sanatoria, or health Homes, have been instituted in different places, where under wise medical supervision patients are instructed in every thing likely to promote health. First, they are removed from the danger of infecting those at home; the varieties of type in the disease may be studied, the digestion corrected, the amount and kind of food regulated, and education in the many details of daily habits carried on.

*Climatic Treatment*—But after what has been said regarding differences of climate, it is only natural to suppose that certain places where the air is pure and cold, exposed to no great changes as regards moisture and temperature, would seem to provide conditions especially favorable to cure. We have in Canada three distinct types of climates, which, for reasons already stated, appear to me to possess superior advantages.

They are, first, the great Laurentide areas of Quebec and Ontario, where in winter, the climate if cold is equable, the atmosphere, owing to the forests, free from great changes, while the air, ozonized by the evergreen forests, supplies for

many cases conditions which have proved perfect. But there is, perhaps, too great an absence of sunshine. Second: The climate of the foothills of the Rockies, from 2,000 to 4,000 feet in altitude. Cold, bright, dry, elevated prairies, they provide ideal conditions, only affected unfavorably in my judgment by often disagreeable winds. But this latter is largely absent in the remarkable elevated belt lying between the Rockies and the Selkirks; the East Kootenay Valley. It is a bright, always dry belt, where we have in addition great forests of pines in open park lands, lessening the wind and the too rapid radiation, yet permitting, owing to the absence of much snow, exercise on horseback or walking almost every day in the year. Yet it possesses the stimulating effects of 4,000 feet above the sea. Third: But there are cases for whom this high altitude is excessive, viz., those with poor circulation or defective hearts. For them we have the lovely valley of the West Kootenays and Kamloops country. There at heights not greater than the hills of the Gatineau, yet where 4,000 may be reached in an hour, almost daily sunshine, with light snowfall, permits of a constant outdoor life under pleasant, easy conditions; usually not very cold, no great daily variations, and yet more, a country where the cured consumptive can very readily undertake a healthy outdoor occupation in fruit growing. With dryness, brightness, slight elevation and with no excessive changes, this glorious climate with pleasant material prospects, may well lure the patient who, under the stress of modern life in our cities, has proved himself unequal to the task, and who may with good reason, expect to gradually recover health through a reconstruction of tissue, where a healthy life in our more rugged eastern climate may prove to him impossible.

# THE WEATHER.

By Otto Klotz.

The continued cool weather during the past spring together with a heavy snow-fall on the 4th May, and some snow on 28th of the same month here in Ottawa, has not passed without comment by old and young, and by the Press.

The question naturally is asked— Why is there such a continuance of low temperature?

If the meteorologist is able to tell us what the weather is going to be tomorrow, why not that of a month or several months hence? Let us try and get a clear idea of how the daily weather forecasts are made. Weather is essentially a matter of the circulation of the atmosphere, and the circulation in turn is due to difference of pressure, the movement of the air being towards those parts of the earth's surface where the pressure is least. The instrument used for measuring the pressure or weighing the air is the barometer, and it is the principal one used in obtaining data from which to make the forecasts. Over the continent from the Yukon to the Gulf of Mexico are distributed stations which daily report telegraphically at the same time either to Toronto or to Washington the state of the atmosphere, that is, the pressure, temperature, direction and velocity of wind, so that the probability officer has the equivalent of an instantaneous photograph of the weather conditions.

Entering the data for the respective places on a map prepared for the purpose, and joining places having the same pressure, or more strictly speaking, the places for which the pressures are given, serve for drawing the lines along which the pressure is expressed in inches and tenths of an inch. Such a line is called an isobar, and the interval between any two isobars represents a difference of a tenth of an inch. If the isobars are crowded together, it is something like having a steep roof, the water running down it faster than on a flatter roof, similarly it is with the air, it is a matter of gradient. When the daily map has thus been filled with isobars immediately on receipt of the data, the officer sees at a glance how the great atmospheric swift is moving, moving of course from where the pressure is great to where it is less, or technically speaking from an area of "high" barometer to an area of "low" barometer.—The area of "high" barometer we may describe as one where the air is piled up and flowing towards the valley of the "low". Now when this "high" is pouring down, and our

"highs" originate mostly in the Northwest, it brings with it the cold air of the upper regions, although modified in its temperature by descent. From years of experience the forecaster, having his constructed weather chart before him, showing the conditions at an absolute instant, can make a pretty accurate estimate what the atmospheric movements are going to be for the next 24 or 36 hours, that is, he gives us our daily probabilities. It may be mentioned that our Canadian Meteorological Service in accuracy of prediction is second to none other.

If we know what time a train leaves Calgary or Edmonton across the continent we have a pretty fair notion (barring blizzards) when it is going to arrive at Ottawa, and so the forecasters having been advised from many sources of the departure of the atmospheric currents knows pretty well when they will arrive here and how they are going to behave. We must bear in mind that electricity travels faster than weather. If the telegraph wires were all cut and the meteorologist were dependent wholly on his own local observations, our daily "probabilities" would have little value. We see then that the meteorologist simply tells us from what has begun to happen what is going to happen.

But why does it happen, why has the air persisted to pile itself up sky-high so to speak in the Northwest, and many other whys?

It is not known, is the answer in brief. But in saying so, it must not be imagined that the problem is not being attacked, and vigorously attacked. The explanation of the beginning of the circulation is very simple. Our great furnace, the Sun, oblivious of the price of coal, is pouring his heat into space and our earth intercepts a very, very small part of it. Where the rays fall vertically or nearly so, more heat is received than where they fall slantingly; compare the melting of snow on a roof facing the sun straight, with one facing sideways, that's exactly the effect in the equatorial and temperate regions. The earth and air in the former become in consequence our terrestrial furnace, receiving the most heat. The heated air rises, and necessarily air to the south and north of the equator flows along the surface to take the place of the ascending air. The circulation of the air has begun. The rotation of the earth modifies the currents in direction and otherwise. Without pursuing the circulation of the air thus started any further, being outside the scope of the present note, it may be pointed out that the earth revolves on its axis from year to year in the same time and its journeys around the sun follow the same old trail during our life-time, the mountains and valleys on the earth or other topographic

features that influence surface atmospheric currents are for our ephemeral existence unchanged, yet who doesn't remember that "the weather is so different now from what it was the same time of the year ten years ago." It seems absolute certainty then that the *causa belli* must be sought in our source not only of all heat but also of all life and of all energy of whatsoever nature upon the earth—the sun.

A good deal is known about the sun, but a good deal more is not known. The sun as has been said is our furnace. Now the trouble is we don't know how the furnace is run, we don't know what kind of heating material is used; it doesn't seem to be fed regularly; we haven't been able to measure accurately yet just how much heat is poured out, on to say a square foot; it is a seething boiling cauldron that is now under pretty close scrutiny, although at rather long range, and its inner working must yield up its story ere we can hope to give a satisfactory answer as to the "why" of weather; for the sun and weather stand in the relation of cause and effect to each other. Variation in the cause produces corresponding variations in the effect. The most promising investigation in solar physics at the present time is the one begun at Mt. Wilson, California, and supported by the Carnegie Institution for at least eleven years, a sun-spot cycle.

What the weather is going to be to-morrow we know, but why it is not the same as last year, we don't know.

---

## PECULIAR NESTING SITE OF AMERICAN BITTERN.

Last evening while walking through a clover field where bobolinks were breeding abundantly, I flushed an American bittern off a nest containing four fresh eggs. The nest was placed in some long, coarse grass about 1½ feet high and was merely composed of a little dead grass flattened out by the bird. I was rather surprised at this find, as there is no marsh within a mile of the locality. Evidently this bird does not always nest in or near swamps. Six other nests of this species have been examined this year, but they were all located in large areas of bulrush swamps.

W. J. BROWN.

Westmount, Que., June 13th, 1907

## THE GOLDEN-CROWNED KINGLET IN ONTARIO IN SUMMER.

While so far no nests have been found, there is sufficient evidence at hand to show that the golden-crowned kinglet breeds in the more southerly portions of Ontario more frequently than is usually supposed. Mr. McIlwraith, in "The Birds of Ontario," records the fact that he once in June met with a pair evidently mated, in a swamp near Hamilton. Mr. James H. Fleming, in his list of the birds of Muskoka and Parry Sound says, "On two occasions I have met with birds in May, that from their actions must have been nesting."

On June 3rd, 1904, the writer found a pair in a dense growth of tall black spruce, at the edge of a bog near Guelph. Both were feeding, and the male was singing in an undertone. On June 12th, 1906, some 14 miles west of Kingston, the writer came across a pair in a fringe of trees between the road and Lake Ontario. In this fringe were many white spruces. The birds repeatedly flew into a bunch of twigs near the end of one of the branches of a white spruce. The male was singing a subdued song.

A. B. Klugh.

Kingston, Ont.

---

## NESTING OF THE AMERICAN GOSHAWK IN LATITUDE 49.42.

By Norman Criddle, Aweme, Manitoba.

On the 14th of April, 1906, while in heavy timber near the Assiniboine River, I was attracted by loud shrill cries to a pair of goshawks. Suspecting that they were nesting, I left the neighborhood with the intention of visiting them again later. This I did in about a week's time, and then found the nest, which was nearly completed, in a large balsam poplar, some 30 feet from the ground, and about 70 yards from the edge of the larger trees. The male bird made several close swoops at me as I walked past, but the female continued sitting just below the nest. The remains of several bush rabbits (*L. Americana*) were noted some distance from the nest on a fallen tree, and the male bird was seen to make a dive at one in a brush pile, coming down with a bang among the twigs and sticks, but the rabbit escaped, owing to the thickness of the underbrush. I again met the male later in the afternoon nearly a mile away,

returning from an unsuccessful raid on a poultry yard, and he made a half-hearted swoop at me as he passed.

On the 30th of April, my brother Evelyn and I again visited the locality with the intention of securing, if possible, both birds and nest. The female was shot with difficulty, as she was very shy, but the male did not appear, in spite of the loud cries of his mate. The nest, which was securely fastened between a large limb and the trunk, and supported by numerous small branches, was a bulky structure about two feet wide, almost a foot high, and about ten inches across inside. The material used for building consisted of sticks, twigs and bark; a coating of about an inch of the latter being used for lining. There were four eggs in the nest, of a bluish-white color, unspotted. An examination of the female hawk revealed another egg ready for being laid. The measurements of this bird were: length, 23½ inches; across the wings, 42 inches. The plumage was practically the same in every respect as that of young birds, perhaps a little grayer. The primaries and tail feathers were much worn at the tips, and showed nearly an inch of the midrib bare. The stomach was empty, with the exception of a few broken bones of a small bird, some dead leaves and bark. The bird was in good condition, having quite a lot of fat upon it.

The male was apparently in perfect plumage, being a rich blue gray above. We waited fully two hours without his appearing.

These birds uttered loud cries when disturbed, somewhat like a sharp-shinned hawk, but deeper and louder. When alone they uttered a more prolonged cry two or three times in succession.

The eggs were evidently sat upon, as soon as laid, as they showed different stages of incubation, one being fresh.

This is the first occasion on which goshawks have been found nesting at Aweme, Man. They are, however, rather numerous in winter, especially the old blue birds, when they do much harm by preying upon the different species of grouse, which with the bush rabbit (*L. Americanus*) form their principal food in these parts.

## MEETING OF COUNCIL.

A meeting of the Council of the Club was held in the Normal School on April 30th, with the President, Mr. W. J. Wilson, in the chair. The members present were, Messrs. Halkett, Gibson, Gallup, Lemieux, Eifrig, and Clarke, Miss Jackson, and Miss Ritchie. The following new members were elected: the Director of the Christian Brothers' Academy, Sussex St., Messrs. W. C. Ewing, M.A.; R. M. Baker, G. S. Malloch, B.A., Ed. Hampson, and Miss K. Waddell. A communication was read from the New York Academy of Sciences, inviting the Club to participate in the celebration of the 200th anniversary of the Swedish naturalist, Carl von Linné, by sending an authorized representative and by presenting an official document, appreciative of the work of Linné, to be read before the members of the New York Academy of Sciences and the assembled guests. It was felt that the Club could not send a representative, but arrangements were made for the preparation of the document suggested.

## SUB-EXCURSIONS

The first sub-excursion of the season was held at Rockliffe, on Saturday afternoon, 20th April. About fifteen persons attended, including four leaders of branches. The day was rather cold, but the sun shone brightly in a clear blue sky, so that a very pleasant time was spent. After exploring the woods, the more open spaces, or the cliffs, the party re-assembled at the side of a sunny knoll, where the President called upon a few of the members to speak on what they had observed: the following is a summary of what was said.

Mr. McNeill was first called upon, and spoke in an interesting way about the harmonies to be observed in nature, pointing out how the lichens absorb elements out of the stones, and decompose them, so that other plants can assimilate them as nutriment. He also said that there is a harmonious co-mingling of colors among certain plants during winter (so that that phenomenon is not altogether peculiar to the milder seasons): instancing that the dog-wood is red, the conifers green, and the birches white.

Rev. Mr. Eifrig was next called upon to speak about the birds seen by him, which embraced two juncos (*Junco hyemalis*), two song-sparrows (*Melospiza fasciata*), two phœbes (*Sayornis phœbe*)—which were mating—a large flock of red-polls (*Acanthis linaria*), and five or six robins (*Merula migratoria*). He said that more birds would evidently have been seen had not the day been windy, as birds venture out less in windy than in calm weather.

Mr. Eifrig also spoke about the mysteries enshrouding the migrations of birds, remarking, in this connection, that there had been this season an earlier migration than usual, with a subsequent lull in April. Numbers of crows (*Corvus americanus*) were also seen during the afternoon.

Following, Mr. Halkett mentioned a chipmunk (*Tamias striatus*), which a few of the party saw running towards and entering its burrow, the entrance to which was inspected; and another chipmunk seen only by himself. He also made a few remarks on various invertebrates collected during the afternoon: such as, specimens of two kinds on wood-lice, *Oniscus* and *Armadillo*, pointing out that the latter is so called on account of the habit of the creatures rolling themselves up into a ball, after the manner of the mammals of that name; certain spiders, remarking that some members of the Club are at present engaged in making a list of the species of that group in the Ottawa district; and various insects, myriapods, and land-snails.

Mr. Gibson then spoke in particular about the insects observed, especially alluding to two kinds of small hibernating caterpillars, and showing examples of their work; and the following in his own words give the gist of what he said about them: "The first of these was the larva of *Argyresthia thuiella*, which has been doing noticeable injury to the white cedars in the Ottawa district during the last year or two. The young larvæ bore inside the tips of the young twigs, killing them and giving the cedars a rusty, sickly appearance. The other species was a beneficial one, the larva of *Hebesana penthina*, which lives in the seeds of the common weed, Mullein, eating them out, and of course destroying them."

"With regard to the insects observed," Mr. Gibson furthermore says, "several specimens of the hedge-hog caterpillar, *Isia isabella*, were found under flat stones, and one larva of *Clemicha virginica*, another common 'woolly bear.' Of the beetles, several species of Carabidæ and Staphalinidæ were collected. The large tortoise-shell butterfly, *Grapta i-album*, was seen, as well as the Camberwell beauty, *Vanessa antiopa*, flitting about in sunny spots in the woods."

Finally, Mr. Wilson, President of the Club, drew the attention of the party to the structure of the rocks examined along the side of the cliff, explaining that they belong to the Black River and Trenton formations. Slabs of stones which he showed contained fossils of brachiopods, trilobites, etc., and he alluded further to other fossils contained in these rocks, such as those of corals.

One flower, at least, of the Hepatica, was found, otherwise

the few leaves of perennials protruding above the ground, betokened the backwardness of the season. A. H.

Ottawa, 24th April, 1907.

The second field excursion of the season was held by the Field Naturalists' Club on Saturday at Beechwood, the search for Hepatica being one of the chief interests.

The day was perfect, and a good crowd arranged themselves at three o'clock under the direction of the various leaders. Mr. Wilson, the President, took charge of the Geological section, Mr. Halkett, of the Entomological, Mr. Eifrig, of the Ornithological, and Messrs. Attwood and Blackadar, of the Botanical section. At the close of the afternoon, the Club assembled at the green-houses and speeches were delivered on the various interests of the afternoon's outing.

The President, Mr. Wilson, spoke of the formation of the rocks in the neighborhood, making special reference to the cliffs about McKay's Lake, which, from a distance, have a white, ashy appearance, but which are composed of shells of varying sizes now in process of solidification into fossil rocks. Mr. Attwood spoke on the necessity for having correct names for things, whether the names be English or Latin, and of the disadvantages of misleading names founded on a superficial and unscientific classification, such as that of our American "Robin," which is not a robin at all but a thrush.

Mr. Eifrig reported that though the day was warm, there were few birds to be seen, which he attributed to the preceding cold snap, causing the birds either to return further south, or else to remain quietly here in some very sheltered spot. He also spoke of it being an "off season" in migration for a couple of weeks, the early birds having arrived some time ago, and it not yet being late enough in the season to expect the warblers and later varieties. He also gave a list of the various species that have already been noticed this season.

Mr. Halkett exhibited a number of specimens collected during the afternoon, amongst them being the somewhat rare Salamander Batrachian. Mr. Blakadar named the various plants that had been gathered by the members during the afternoon. ANNA E. SINCLAIR.

## O. F. N. C. BOTANICAL CLUB.

April 11. An interesting meeting of the Club was held at Dr. Fletcher's house, present: J. Fletcher in the chair, Prof. Macoun, Dr. H. M. Ami and Messrs Attwood, G. H. Clarke, T. E. Clarke, Harrington, J. M. Macoun and R. B. Whyte.

The chairman alluded to the suspension in the work of the

Club owing to various causes which could not be avoided. He also drew attention to the advantages of the meetings which provided not only interesting reunions but also could with a little effort be of great assistance to the Editor of THE OTTAWA NATURALIST if the members would prepare short notes on botanical subjects to be read at the meetings and then published in the monthly magazine.

The chairman spoke of the Tarry Cockle, *Silene antirrhina* as a Farm weed in the West and also read some very interesting extracts from letters by Mr. W. Collingridge Bing of Castlegar, B.C., describing annoyance and losses in his poultry runs from the young chicks being caught and held fast prisoners by the tarry patches on the stems sticking to their down. Even a five weeks old chick is powerless to free itself if caught over the back. The weed is very abundant in his chicken run of 7 acres. Mr. James Macoun had seen the weed occurring in remarkable abundance in some parts of British Columbia.

Other remarkable weeds mentioned by the chairman were *Draba nemorosa*, *Draba Caroliniana* and *Corydalis aurea* all of which occurred on stubble field in Manitoba.

Mr. G. H. Clarke spoke of the abundance of the seeds of dodder in samples of alfalfa and other kinds of clover seed now being offered for sale. Owing to a shortage in the Canadian crop of 1905, a great deal of clover seed was being imported. From past experience, the speaker did not anticipate that there would be much trouble from dodder in Canadian fields although some species might persist for a time. Mr. Clarke also exhibited a full set of the beautiful plates by Norman Criddle for the illustrated bulletin on Farm Weeds of Canada which he hoped would soon be issued.

Prof. Macoun gave an excellent address on the value of critical study in botany instancing the remarkable number of new species of flowering plants detected by Prof. Fernald in a few weeks collecting in Lower Canada. The speaker urged the members to collect and study carefully all the local plants of the district. Many of the old species under critical study in all their parts had been found to cover several distinct species. Dr. H. M. Ami read an account of the Sugar Maple and the manufacture of Maple sugar from an old work published early in the last century. This article brought out a most interesting discussion on the general subject.

Dr. Ami also protested vigorously against private corporations as telegraph and telephone companies being allowed to cut and injure the shade trees which were such an attractive feature of many cities and which belonged to the public.

Mr. James Macoun reminded those present of an interesting lecture which would be delivered in Ottawa on May 31 by Dr. Pollard on the work of the Wild-flower Preservation Society. J. F.

# THE OTTAWA NATURALIST

VOL. XXIII. OTTAWA, JULY, 1907 No. 4


## FUNGI FROM THE KAWARTHA LAKES (AND A FEW FROM TORONTO) INCLUDING SEVERAL NEW SPECIES.


by CEPHAS GUILLET, TORONTO.


During August, 1905, the present writer traversed the Kawartha Lakes in a canoe between Stony Lake and Cobconk. This beautiful region, lying in Peterboro and Victoria counties, is about sixty miles north of Lake Ontario, and 800 to 900 feet above the sea. The following August a less extensive trip was made from Stony Lake to Deer Lake. During these outings a large number of fungi were collected and dried, notes having first been taken upon the specimens in a fresh state. The specimens, with the notes, were sent to Dr. C. H. Peck, New York State Botanist, an eminent authority on fungi, who very kindly identified those given below. Several species new to science were found among them, which Dr. Peck has named. A few fungi were also collected in or near Toronto. As comparatively little has been published regarding the fungi of Canada, the following list may be of interest to readers of THE NATURALIST. One may add that a little work of this kind, which anyone may do, greatly increases the interest of such outings, already delightful, and adds a pleasing, if slight, altruistic motive.

Lachnea scutellata (L.) Sou. (a cup-fungus).

Thelephora willeyi, Clint.

Clavaria gracilis, Pers.

Clavaria muscoides, L.

According to G. T. Atkinson, (in "Mushrooms") all coral-like or club fungi (Clavariaceæ) are edible, though a few of them, and these mostly the small species, are rather tough. All puff-balls likewise (Lycoperdaceæ) are edible so long as they are quite white inside, though some are better than others.

Fomes leucophaeus, Mont.

Polystictus hirsutus, (Wulf.) Fr.

Polystictus pergamenus, Fr.

Polyporus weinmanni, Fr.

Polyporus elegans, Fr.

Polyporus albellus, Pk.
Polyporus picipes, Fr.
Poria vulgaris, Fr.
Favolus europaeus, Fr. (F. canadensis Kl.)
Lenzites sepiaria, Fr.
Boletus scaber, Fr. (edible).
Boletus americanus, Pk.
Cantharellus umbonatus, Fr.
Paxillus involutus (Batsch.) Fr. (edible).
Coprinus plumbeus, Pk.
Hygrophorus mineatus, Fr. (edible).
Russula fragilis, Fr.
Russula fallax (Schaeff.) Fr.
Lactarius chrysorrheus, Fr.
Lactarius paludinellus, Pk.
Lactarius subdulcus (Bull.), Fr.
Schizophyllum alneum, L. (S. commune Fr.)
Marasmius rotula (Scop.), Fr.
Marasmius elongatipes, Pk.
Marasmius siccus, Schw.
Panus stipticus (Bull.), Fr.
Lentinus spretus, Pk.
Amanitopsis vaginata (Bull.), Rose. (edible).
Lepiota granulosa (Batsch.), Fr.
Armillaria mellea, Vahl. (edible).
(Another Armillaria Dr. Peck thinks a new species, but fears to describe or name from the one specimen secured).
Agaricus silvicola, Vitt. (edible).
Stropharia semiglobata (Batsch.)
Hypholoma hymenocephalum, Pk.
Flammula spumosa, Fr.
Flammula flavida, Fr.
Inocybe subtomentosa, Pk.
Pleurotus decorus, Fr. (Clitocybe decora [Fr.]).
Pleurotus ostreatus (Jacq.), Fr. (edible).
Crepidotus fulvotomentosus, Pk.
Panaeolus campanulatus (L.) Fr.
Pluteus cervinus (Schaeff.), Fr. (edible).
Pluteus tomentosulus, Pk.
Clitopilus albogriseus, Pk.
Leptonia serrulata (Pers.), Fr.
Leptonia subserrulata, Pk.
Omphalia fibula (Bull.), Fr.
Omphalia campanella (Batsch.), Fr.
Omphalia curvipes, n. sp. 2nd August, 1905; Horseshoe Island, Stony Lake; growing out from underneath or

side of very rotten log, and turning so as to have the gills downward.

Omphalia vestitus, n. sp. Latter part of August, 1906; Horseshoe Island, Stony Lake; on the ground in low places near the water.

Clitocybe nobilis, n. sp. 8th August, 1905, and 21st August, 1906; south shore of Deer Lake near and west of Victoria Spring; growing solitary or two close together on the ground in a little clearing. The writer has given specimens to Dr. Peck, who calls it "a fine new species," and to Toronto University.

Clitocybe ectypoides, Pk. Of several of the specimens of this species which I sent to Dr. Peck, he says: "They appear to be a small smooth variety of Clitocybe ectypoides Pk. The radiating fibres on the pileus in the type-form are absent in this form, with which I have not before met." They were found 16th August, 1905, near Cliff Spring, south shore of Pigeon Lake, on a rotten log.

Clitocybe eccentrica, Pk.
Clitocybe laccata (Scop.), Fr. (edible).
Clitocybe laccata pallidifolia, Pk.
Clitocybe adirondackensis, Pk.
Clitocybe albissima, Pk.
Tricholoma rubescentifolia, Pk.
Tricholoma albiflavidum, Pk.
Mycena epipterygia (Scop.), Fr.
Collybia dryophila (Bull.), Fr.
Collybia confluens (Pers.), Fr.
Collybia radicata (Relh.), Fr. (edible).
Collybia radicata furfuracea, Pk.

Collybia hirticeps, n. sp. 23rd August, 1905; south shore of Pigeon Lake, near Cliff Spring; growing in a tuft of about eight on a rotting branch in the woods. Dr. Peck says it is allied to C. zonatus Pk.

Collybia stipitaria campanulata, n. var. 30th August, 1905; Horseshoe Island, Stony Lake; growing from the bark on a fallen young arbor vitae, in a dark hollow. Dr. Peck writes that he found the same variety in N. Y. State in July of the same year, growing on arbor vitae branches. He had not yet published it when he wrote. The description of this new fungus will doubtless be given in the N. Y. State Report. Descriptions of *Clitocybe nobilis* and *Collybia hirticeps* have been published by Dr. Peck in the *Bulletin of the Torrey Botan-*

*ical Club*, 34: 1907, pp. 97 and 98. Descriptions of the other new species will appear later.

Cyathus striatus (Huds.), Hoffm. (a bird's nest fungus).

Fuligo ovata (Schaeff.), Macbr., or as given in Saccardo Fuligo septica (L.) Gmel. This is one of the interesting Myxomycetes or slime-moulds, an intermediate group of organisms with relationships both to plants and to animals. "In their spore-producing stage," says Underwood (*'Moulds, Mildews, and Mushrooms'*), "they resemble the fungi, but they are not true fungi. In their vegetative or growing stage they resemble certain of the protozoans, but they are not true animals."

TORONTO SPECIES.

Sarcoscypha coccinea, Jacq. May, 1907. The common scarlet cup-fungus found on sticks in woods in early Spring, and sometimes late in the Fall.

Coprinus micaceus, Fr. 27th July, 1905 (edible).

Panus stipticus (Bull.), Fr. 18th October, 1906.

Claudopus nidulans (Pers.), Pk. 18th October, 1906. This is *Pleurotus nidulans, Pers.*

Psilocybe fœnisecii (Pers.), Fr. 13th July, 1905.

Galera lateritia albicolor, Pk. 13th July, 1905.

Geaster limbatus, Fr. (an earth-star). 18th October, 1906;

Fuligo ovata (Schaeff.) Mackr. 18th October, 1906.

---

## NEW BRUNSWICK FLYCATCHERS.

BY WM. H. MOORE, SCOTCH LAKE, N.B.

We have many species of flycatching birds in this Maritime Province, but in this paper we will deal only with the members of the family Tyrannidæ that occur here. Should we have the specimens in hand, we find that the bill is broad and depressed at the base, and about it grows a number of bristly feathers which serve to assist in capturing insects, and to restrain the struggles of captives. The number of primaries are ten, the first of which is long. There are twelve rectrices, or tail feathers, and the hind claw will be found not smaller than the middle claw.

With some field practice one is enabled to recognize flycatchers from their habit of sitting upon some prominent perch as they await the passing of some insect that they desire to add to their bill of fare, then rapidly darting forth to seize the prey and often returning to the same perch.

Our flycatchers are necessarily migratory as they depend almost wholly upon insects for a food supply, so that six months is about the limit of time each year, that they are with us. They are not endowed with the power of producing a musical song as are many of our other birds, but are quite as conspicuous through their unmusical calls of love or rage, as are many of our musical songsters through their powers of emitting more chordant sounds.

In nest building they exhibit various styles of architecture, and some species display considerable ingenuity in building nests to closely resemble surrounding objects. With the exception of a species recently added to our list, none of our flycatchers have brightly colored plumage. All are robed in inconspicuous grayish or dull colored plumage and the sexes much resemble each other.

Each species has its favorite habitat, thus they are distributed throughout the province in localities that suit each species. For this reason we find some species about orchards, others live about water-courses, and again there are those that live mostly in wooded tracts. One species of accidental occurrence has had its habits very little studied while in our land, and possibly another may not occur with us for years to come. The species referred to is the scissor-tailed flycatcher (*Milvulus tyrannus*) and is of accidental occurrence. May 21st, 1906, a bird of this species was secured at Clarendon Station, Queen's Co., N.B., by Mr. G. S. Lacey. This is the only record so far known of this species being taken in this province. It had evidently come north with the migration wave that passed here May 18-20. Then followed cold, wet days, and migration was again nearly at a standstill. Insect life was so cooled down May 21-22 by a fall in the temperature that a scarlet tanager was observed by the writer hopping about on plowed ground searching for food. Bird life suffered greatly in consequence of the fall in the temperature.

This scissor-tailed flycatcher when first observed was flying about alighting upon the ground and low perches, and was at first thought to be a shrike, but when alighting within a few yards of Mr. Lacey, its oddity was noticed, and procuring his gun he secured the *rara avis*. According to Mr. Lacey, this bird measured fourteen inches in length. The upper parts were gray or ashy, light underneath; wings and tail blackish; the tail deeply forked and about ten inches in length, the under side washed with a pinkish color as was the lining of wings. The scissor-tailed flycatcher is of decidedly greater length than any of our other flycatchers, but the body is no larger than that of the kingbird.

THE KINGBIRD (*Tyrannus tyrannus*) is a resident of orchards during its breeding season. While migrating, its

route seems to be along water-courses. A pair of these birds will vigorously drive other birds from their hunting grounds, and they display special hatred to crows and hawks, attacking them if they come near the home of the kingbird. They fly along above their enemies and swoop down at them, constantly uttering their shrill cry of rage. The large birds are thus escorted to some distance.

The kingbird arrives in central New Brunswick from the south about the middle of May. The thirteenth, fifteenth and eighteenth are dates of arrival for three years. They depart again about the first of September. Nest building begins in June, and from three to five eggs are laid in a nest built of coarse dried grass stems, intermixed with wool. The eggs and young are zealously guarded by the parent birds, who raise a great outcry if the nest is molested. The food of the kingbird consists largely of insects, especially injurious to the welfare of man. Some wild fruits are eaten, and but very little cultivated fruit or berries are ever touched.

THE CRESTED FLYCATCHER (*Myiarchus crinitus*) is of rare occurrence here. Some have been observed in August when on the southward migration, and at that time were frequenting the tops of dead trees that reached high above the surrounding forest. The top of a very tall dead hemlock tree was a favorite stand, and from this they would dash swiftly for a distance of fully one hundred yards to capture some insect. Since this tree was blown over, some half-dozen years ago, we have never seen the birds. This species is reported to pass the summer season near Woodstock, Carleton Co., N.B.

THE PHOEBE (*Sayornis phoebe*) is the earliest of the flycatchers to arrive from the south, and is due to arrive from the middle of April until the first of May, according to the state of the weather, which regulates the supply of insects upon which they feed. I have never observed the phoebe here in summer, nor during the autumn migration. In spring their favorite resort is along water-courses bordered by low lands upon which grow elm trees. Among the elm tree-tops and near them they find many insects to their liking, after which they swiftly dart, snapping their bills as they capture the insects. Then returning to their place of observation, give vent to their feelings in utterance of discordant harsh calls somewhat resembling the name of the bird —phoebe. So closely do they follow the larger streams in this section that I have never observed them a mile from streams that are bordered by elm grown intervals.

THE OLIVE-SIDED FLYCATCHER (*Contopus borealis*) is distributed throughout the wooded tracts of the province. In no

section are they found in abundance, and with the exception of a family gathering, not more than a pair will be found together. They arrive in this section from the south about the middle of May. They apparently migrate at all hours. The first arrivals have been heard in early morning, during the middle of the day, and well along in the afternoon. When near at hand, the call or song of the male sounds like the three notes "Whew-take-care," but at a distance of a hundred yards or more the first note is not audible, and we hear only the two last syllables, "take-care." Many of the small birds and various species of insects could undoubtedly interpret the call of the olive-side as it sounds in the ear of the Anglo-Saxon, "take-care," for you are liable to be waylaid by a feathered tyrant who seems to know no fear.

The olive-side chooses some tall evergreen tree as a screen and foundation for its nest, which is composed of twigs and mosses and built well out on a limb. The usual number of eggs is four. The young are fledged and ready to begin the southward march by the first of August. The migration route of this species is along the larger streams, and by the tenth of August they have gone from this section for a period of eight months.

The calls of the olive-sided flycatcher made such an impression upon the memory of the writer in his early days that nearly thirty years later when the bird was identified and its name learned, the calls would awaken childish reminiscences of earlier days when not more than a half dozen birds were known to the people of an entire settlement.

THE WOOD PEWEE (*Contopus virens*) is a bird of the orchards and hardwood knolls. It is a bird smaller than any of the foregoing species, except the phoebe, which it closely resembles in size. The call or song of the pewee is characteristic of the species and is a series of modulated tones imitating the word "pewee". The pewee is due to arrive from the south the latter part of May, and stays with us about four months. During its stay the greater part of the time is taken up with family affairs. The nesting site is usually chosen upon some horizontal limb of a goodly sized tree, and at a height varying from a few feet to fully sixty feet. The nest is built of a downy substance inside, covered with lichens or mosses, to closely resemble natural growths upon the limbs and trunks of surrounding trees. The eggs, usually four in number, are beautifully marked, and carefully guarded by the parent birds.

THE YELLOW-BELLIED FLYCATCHER (*Empidonax flaviventris*) is tolerably common in southern parts of this province, but in the interior it is a rare species. It breeds throughout the sections where it is a summer resident. The writer has had no personal experience with this species, so rare is it in this locality

THE ALDER FLYCATCHER (*Empidonax traillii alnorum*) is tolerably common along alder bordered streams. It arrives from the south late in May when one is notified of its arrival by hearing its harsh call which, to some observers, sounds like the following notes, "kzer-wee," uttered persistently as the bird sits at rest upon some twig, when upon the lookout for its favorite insects. The nest of this species is a good imitation of a bunch of dried grasses lodged in the forks of a small bush by water during freshets. An observer unacquainted with the habits of our flycatchers, would never suspect that the nests of the wood pewee and alder flycatcher belonged to nearly related birds, yet both nests are good imitations of objects occurring in their vicinity, thus showing that the birds try to protect the eggs and young in a thoughtful manner.

THE LEAST FLYCATCHER (*Empidonax minimus*) is a habitant of orchards and second growth deciduous trees. With the exception of the pewee, the call and song of the least flycatcher is more pleasant to the ear than any of the other flycatchers' notes. A common name applied to this species is derived from its notes which sound "Chebeck, chebeck," and may be heard from the time the birds arrive from the south in May until after the young are fledged, in June. The eggs of the chebeck are quite unlike the eggs of our other flycatchers, being of a spotless cream color throughout. The number of eggs is three or four. The nest is compactly built of shreds of bark, weed stems and feathers, lined with plant down, and usually placed in the forks of a small tree, or among twigs of a horizontal branch of a conifer. Squirrels and blue jays are persistent enemies, robbing the nests of both eggs and young birds. This species seems to put more confidence in man than does any of its kin, therefore, it may often build its nest and rear its young in close proximity to our own buildings. In the construction of their nests they like to get bits of string that are often put out for the special benefit of the birds. The strings make good material for binding the nest together and to its foundation.

## MEETINGS OF THE ENTOMOLOGICAL BRANCH.

Meeting No. 6 held at Mr. Baldwin's house, 21st March, 1907; present Messrs Fletcher, Harrington, Halkett, Young, Gibson, Metcalfe, W. H. Baldwin and J. W. Baldwin.

Mr. Gibson showed an inflate of the larvae of *Sphinx eremitus* which had been found feeding on Monarda, also one of *Sphinx kalmiæ* covered with the conspicuous white cocoons of an *Apanteles*. A specimen of the larva of *Parorgyia clintonii*, destroyed by an *Apanteles* the larvæ of which on emerging from their host spin a mass of silk like a tuft of cotton wool, and an inflate of a white grub were also shown.

Mr. Young exhibited a large case showing life-histories of *Papaipema pupurifascia*, *Papaipema harrisii*, var., *Papaipema thalictri*, *Papaipema cataphracta*, *Parorgyia clintonii*, *Tinea granella*, *Peridroma occulta* and *Caripeta divisata*. These were much admired by those present.

Mr. Halkett showed two butterflies which he had collected in Europe in 1900, one *Vanessa atalanta*, at Paris, France, and the other *Parnassius apolla*, taken in Switzerland.

Dr. Fletcher exhibited a case of dragon flies which had been determined by Dr. E. M. Walker, of Toronto. Among these were some interesting local species which had not previously been recorded from the Ottawa district. *Gomphus adelphus* taken at Hull, P. Q., new to Canada; *Gomphus brevis*; *Basiaeschna janata* and *Helocordulia uhleri* were the species of most interest. Dr. Fletcher also showed the 2nd Volume of Dr. Felt's new work on "Insects Affecting Park and Woodland Trees. This was much admired.

Mr. Metcalfe spoke of the parasite *Psilomastix exesorius* which he had reared from the chrysalis of *Papilio asterius* and showed specimens. An interesting discussion took place on parasitic insects in general.

Mr. Harrington showed specimens of three species of *Panorpa* which he had taken at Ottawa. He also showed some sawflies and particularly drew attention to the wide range of some species. Some might be found right across the continent from New Brunswick to the Pacific Coast and up into Alaska. He stated that his own collection had been rearranged and that he would now be glad to assist any of the members who cared to take up this interesting branch of study. He advised that as many as possible of the larvæ should be collected in spring as in that way it was much easier to get good specimens than to carry the larvæ over the winter, many of the species being double brooded.

Mr. Baldwin exhibited his collection of lepidoptera and pointed out some of the rarer species which he had taken at Ottawa during the last year or two. Some of these were particularly interesting and the only records for the district.

J. W. B.

The 7th meeting of the Entomological Branch was held at the house of Mr. Halkett, on the evening of the 4th April, 1907. There were present, Dr. Fletcher, and Messrs. Harrington, Gibson, Young, Baldwin, Metcalfe, Wilson, and Halkett.

Mr. Harrington exhibited two cases of hymenoptera, consisting of the Siricoidea and a portion of the Tenthredinoidea. The collection contained many interesting species from all parts of Canada, and also some from the United States. Some of the species were stated to be apparently undescribed, and types of several species described by Provancher were included. Attention was directed to some of the more injurious forms, and to the fact that the insects in this division of the hymenoptera were of special interest, as the larvæ were phytophagic, and often so abundant as to cause great devastation. Mr. Harrington also presented a list of forty species of spiders which had been recently determined by Mr. Nathan Banks, and stated that about a dozen were additions to the Ottawa list of Arachnida.

Mr. Wilson made mention of the destruction caused in Northern Ontario by the larvæ of the Larch Sawfly, *Nematus Erichsonii*, chiefly eastward of Nipigon, and referred to petrified wings of sawflies found by him in slabs of slate in New Brunswick.

Mr. Gibson exhibited a magnificent pair of the Imperial Moth, *Eacles imperialis*, Dru., male and female, which had been presented to the Division of Entomology by Mr. T. W. Ramm, of Ross Mount, Ont. The species, although rare in Canada, has been taken at Ottawa (once), Port Hope, Toronto, and one or two other localities in Ontario. Specimens of *Lepisesia ulalume*, Strck., from Vancouver, B.C. (A. H. Bush), and co-types of *Recurvaria gibsonella* and *Recurvaria conijerella* were also shown. These two latter are new local species reared by the exhibitor, and described by Mr. W. D. Kearfott, of Montclair, N.J.

Mr. Young showed a box of microlepidoptera, which had just been named for him by Mr. Kearfott. Among these were 10 new Ottawa species, the descriptions of which have just appeared. The names *Enarmonia youngana*, *Enarmonia fletcherana* and *Carposina ottawana* were of particular interest to those present. Regarding the collection of these small moths, Mr. Gibson spoke of a trap which had been devised by Mr. J. D.

Evans, of Trenton, Ont., and explained how it was made. Mr. Evans has been very successful with it.

Dr. Fletcher showed specimens of two species of neuropteroid insects found in winter on the surface of snow, apparently *Boreus californicus*, Pack., and *Boreus unicolor*, Hine. They were collected by Mr. J. W. Cockle, at Kaslo, B.C., during the past winter. An ichneumon parasite and the pupa of *Grapta interrogationis*, and a beautiful pair of the British Columbia *Thecla dumetorum*, Bdv., the under side of which, like that of its close ally *T. rubi*, of Europe, is bright green, a colour seldom seen among butterflies, were also exhibited, as well as specimens of *Leptarctia californica*, Wlk., and *Brephos infans*, Mœschl., which superficially resembled each other very much, but are in no way related to each other. Dr. Fletcher also spoke further on insect traps, and urged the members to begin at once to lay their plans and get apparatus in order for the coming season.

A. H.

---

## *LEUCOBREPHOS MIDDENDORFI*, MEN.

Three beautiful specimens of this very rare moth were recently received from the Mayo River, Yukon Territory, by Mr. Joseph Keele, of the Geological Survey Department. These were collected by Mr. J. A. Davidson, of Duncan Creek, Y.T., on April 16th, 1907. This moth is extremely rare in collections and these specimens are important as showing the wide distribution of the insect. The specimens were of an unusually dark form, but are similar to one specimen reared by me from eggs received from Mr. Norman Criddle, of Aweme, Manitoba. This specimen was one of about a dozen from the same batch of eggs, the remainder of which were of the normal gray form. I have also two specimens of the dark form which were brought back from Labrador in 1894 and were taken by Mr. A. P. Low during his exploration of that country. They were collected on the portage at Grand Falls, Hamilton River, Labrador, on May 12th, 1894. Although so exceedingly rare in collections, the insect appears to be of very wide distribution, and, as it is also very difficult to capture and appears very early in the year, it is possible that it may have been overlooked in intervening districts. It would be well for collectors to be on the alert to capture any specimens of a black and white very active moth which they may see early in the year in northern regions.

J. FLETCHER.

## SUB-EXCURSIONS.

Old Beaver Meadow, did you say? Follow the old road past the old toll-gate and you'll come to it. You must be mistaken,—for the meadow where the Field Naturalists gathered on the 18th of May, 1907, could never be called old. Such a charmingly fresh and beautiful spot! Nature in all the suggestiveness of youth! The delicate traceries of the branches of elm and maple were half concealed, half set forth, by a wonderful indescribable adornment of fluffy tufts and tiny tendrils and wee curled buds. Leaves, did you call them? Such an ordinary name! Nature has nothing so ordinary! And, Oh! the colors of everything! That delicate yellow green and the cool silver-grey, and those browns—golden brown, brown and reddish brown! How the colors of Spring haunt the mind of the artist, as with futile attempt he mingles the tints of his paint box, trying with the seductive wiles of combination to catch just that tone! How it pursues him in his dreams—just that tone!

But imagination would wander as the Field Naturalists wandered that afternoon, and would that the results of its meanderings might be as satisfying. Through the cedar woods they went, some here, some there; some to find happiness in the gentle hepatica, fair trillium and aromatic ginger-root, and treasures of tree and shrub, others in the birds, the many colored warblers and sweet-voiced sparrows, others again absorbed in the little creatures that creep or fly, some indeed that both creep and fly, and yet again, a group who find the greatest charms in a hard, grey substance which sometimes yields its secrets reluctantly, but those secrets possess the charm of the classics in that, though dead, they live forever.

As for us, and there were many like us, we enjoyed something of it all. "Gleam and gloom, and woodland bloom, and breezy breaths of all perfume!" An overturned rock showed groups of tiny ants, brown and black, like moving beads. Ever and anon the clear, sweet note of the white-throated sparrow came to us. Then, through a barbed-wire fence to a cutting of lime-stone rock. What an interesting old-time world, Mr. Wilson points out to us! Shells and crinoids and coral, all preserved, as Mother Nature knows how, between the leaves of her hard, grey book. Such an alluring story for those who will trouble to read!

Then back through the woods! Now some one finds a "good old snail with an English name." Then a flash of color calls to our eyes,—it is a warbler! There is another! But what a beauty! Such a brilliant orange throat and yellow head and

black and white striped wings. We must ask its name! Then following our leader—he pretends to know and takes the wrong road for variety—we gather at the rendezvous.

It is a beautiful spot, a little green dale with hills rising gently around it,—hills covered with many trees of lightsome garments and here and there a sombre pine. At our feet is a hearty little stream, and you can trace its course by the brown-leaved bushes coaxed to its side. In and out of these bushes flashes the black-throated blue warbler, and from all sides come the songs of the birds. It is their even-song. Up behind the hills, great, soft, white and grey and golden clouds are gathering, and the light and shade fall on the fields before us. We see it all and hear it almost unconsciously, for our leaders now are telling each the results of his afternoon's search. They are wonderfully modest, these leaders. They never make us feel the amount of their knowledge and the littleness of ours, but ever strive to interest and cheer us on to know more and to love better.

Mr. Macoun speaks of the birds that have charmed us with color and flight and song, and our unspoken questions are answered. It is because of the shelter of the meadow that so many birds have gathered here this afternoon. Warblers in unusual variety and sparrows and black-birds! It is not on the beauty of these little creatures that the speaker dwells, it is on their usefulness. How dependent we are on them! For should these little creatures cease to be, what is to save our crops from utter blight of insect life grown strong through absence of its old-time foe! There is so much practical value in our study of Nature.

And now it is Mr. Clarke's turn. And as he speaks of tree and flower and bush, a beauty comes to them,—a beauty quite apart from form and color. How, on the wooded hillside grow the hepatica, bellwort, adder's tongue, barren strawberry, columbine, trillium, mitrewort, squirrel corn and wild ginger. And down in the low grounds along the stream, the violets in profusion make their home, and the marsh-marigolds and sweet gale and meadow rue and *Spiraea salicifolia* fringing the stream in great numbers, but not in bloom. And on the dry, thin soil the white cedar, red cedar and juniper find the land of their choice. It is a charming talk and impossible of reproduction by the unlearned.

Mr. Halkett speaks of various zoological objects collected during the afternoon. Of mollusks, there were species of land snails (Helicoids), a specimen of a fresh-water snail (*Planorbis*), and a shell of a bivalve-mollusk (*Sphærium*), the last mentioned

of which was found by Mr. Lemieux. Also winged ants are shown which were found with the rest of the colony under a stone; and three specimens of a salamander (*Spelerpes bilineatus*) found by Mr. Lemieux, under a stone beside a brook.

These specimens are produced one after another from interesting looking paper bags ranged side by side on a stump. There is something that raises one's hopes about those paper bags! And now, expectation, fed on snails and ants and salamanders, is watching with large eyes for the next bag. This bag has been handed to the speaker by Mr. Gibson. It is opened, and out is lifted a squirming, resisting, black and white object,—a conspicuously colored milk snake (*Coronella doliata*). This snake, it is pointed out, is very similarly marked to one collected near the Rifle Range last year, and which was mentioned in the zoological report as probably being a specimen of a southern variety of the milk snake.

There were yet other things found this afternoon. From Mr. Gibson we found that the backward spring had been a little too much for our entomological friends, and they had been keeping indoors much longer than was their custom. A single specimen of the native white butterfly was seen, also a few geometrid moths flying in open places. Under flat stones, the most interesting objects secured were some specimens of a very large spider, which as yet has not been determined. Hibernating larvæ of *Noctua clandestina*, *Leucania commoides* and *Isia isabella* were found, too, as well as specimens of several kinds of ground beetles.

We had the pleasure of having with us, accompanying Mr. Gibson, an Honorary Member of the Club, the Rev. G. W. Taylor, a distinguished entomologist from Wellington, B.C.

And now it is over. The soft mists of early afternoon which had gathered into great clouds, now sprinkle a few drops just to show what they might have done. But the homeward-bound are on the quaint old road, by its rows of elms and poplars, and it matters not. It is just an opportunity for Nature to show one more beauty,—her own special color scheme,—for the green of woods and fields, the blue of sky and water, the gold and pink of sunset, and grey and mauve of everything, are gathered in one radiant, soft-tinted arch across our path—a rainbow.

R. B. McQ.

## NOTE ON THE EUROPEAN CARP.

To the Editor of THE OTTAWA NATURALIST:—

The species of fish, which you kindly drew my attention to at Lapointe's, the fish-dealer's, two large specimens of which were purchased for the museum, is the European carp (*Cyprinus carpio*). The specimens are from Lake Ontario, and were transported from Toronto to Ottawa. They weigh some 22 pounds each, being within ½ pound of each other, and measure respectively: (1) 2 ft. 9 ins. long; 9 ins. deep; 1 ft. 10 ins. girth; (2) 2 ft. 8 ins. long; 10 ins. deep; 2 ft. girth. A number of much smaller specimens were also seen at the same time in the market. Another specimen of this species in the Fisheries Museum, from the Bay of Quinte, near Belleville, Ont., is mentioned in the Zoological Report of the Club; and Mr. Hurley, Fishery Officer, states that the carps are infesting the Bay of Quinte in thousands. When fresh the two specimens from the market manifested high coloration: they were a vivid golden colour, and the paired fins, opercular covers, and other parts were bright reddish, a feature which Prof. Prince considers, probably, due to seasonal characters, owing to the approach of the spawning time. The structure of the carp is to be found treated of in various ichthyological works, and, therefore, need not be entered into here; and a very full account of how injudicious it has been to introduce the German carp into our waters will be found in an article entitled: "The Place of Carp in Fish-culture" (Supplement No. 1 to the 29th Annual Report of the Department of Marine and Fisheries, Fisheries Branch, 1896), by Prof. E. E. Prince, Commissioner of Fisheries.

ANDREW HALKETT.

Ottawa, 22nd April, 1907.

---

## INJURY TO NESTS BY MUSKRATS.

During the past week we have found three nests of the Virginia rail and one nest of the American bittern, with the eggs all smashed. As these nests were all located in marshes in remote parts of the country, I have placed this destruction to the credit of the muskrats, which are quite common in the district.

I shall be very glad to have the views of some of our ornithological friends on this subject, and to know if my conclusions are correct.

W. J. BROWN.

Westmount, Que., June 3rd, 1907.

## REVIEW

THE TREE BOOK, A POPULAR GUIDE TO A KNOWLEDGE OF THE TREES OF NORTH AMERICA AND THEIR USES AND CULTIVATION. By Julia Ellen Rogers, with sixteen plates in color and one hundred and sixty in black-and-white from photographs by A. Radclyffe Dugmore. Doubleday, Page & Co., New York, pp. 589, $3.00.

Ranging from Dr. Sargent's monumental work to hastily prepared books to supply the demand for Nature Study literature so much has been printed about trees during recent years that where a single book is to be purchased it is difficult to decide upon the one to buy. If the purely technical works be excluded it may be safely said that none approaches "The Tree Book" for general use. Profusely illustrated, printed on paper of the best quality and full of useful information, popular and scientific descriptions have been combined in such a manner that one familiar with all our trees will find almost as much in it that is new and interesting as will the school-boy who is beginning the study of trees. The first four hundred and fifty large quarto pages deal with "How to Know the Trees" Beginning with the pines and ending with the irburnums and elders, every family being prefaced by a key to the genera, each species is described, and following its description is a mass of information which includes a detailed account of all the known uses to which any part of the tree is put. Part II deals with "Forestry", Part III with "The Uses of Wood", and Part IV with "The Life of the Trees". An exhaustive index completes a volume which everyone, even remotely interested in forest trees, should own and study.

---

The delay in publishing this number of The Naturalist is due to the illness and absence from Ottawa of THE EDITOR.

# THE OTTAWA NATURALIST

Vol. XXIII. OTTAWA, AUGUST, 1907 No. 5

## NOTES ON THE GEOLOGY AND MINERAL RESOURCES OF TRINIDAD AND BARBADOS, B. W. ISLANDS

By R. W. Ells, LL.D., Etc.

Summary of paper read before Royal Society of Canada, May, 1907.

The islands of Trinidad and Barbados are among the most southerly of the Windward island group of the West Indies. The former lies a few miles off the north coast of South America, opposite the mouths of the Orinoco river, with an area of 1,750 square miles, and a population of about 255,000; the latter, about 200 miles to the north-east, with an area of 166 square miles, and with a population of rather more than 1,200 persons to the square mile, can rightly be considered the most densely populated country in the world in so far as now known.

The geology of both these islands is quite simple. In Trinidad, the northern portion from the passage separating the north-west corner from Venezuela, known as the Boca, to the cape at the north-east extremity, is occupied by a range of hills with elevations rising in places to more than 3,000 feet, composed of slaty and schistose rocks with occasionally areas of limestone. The schist is cut by veins of quartz, generally of small size, in which traces of gold are found, while the presence of iron has also been recognized at several points. These schists are the oldest rocks in the island, and resemble the lower Cambrian of Canada in many respects.

South of this and comprising by far the greater part of the island the rocks are much more recent, consisting for the most part of shales and sandstones of Tertiary age, with possibly small areas of underlying Cretaceous, especially along the southern flank of the mountain range. These Tertiary rocks comprise large areas of oil-bearing sandstone, and the formation as a whole, is thrown into a series of folds or anticlines, of which four principal ones have been recognized as extending in a general east and west direction across the southern part of the island, with several secondary ones. Along the courses of all these, oil-springs, outflows of asphalt or thickened petroleum and occurrences of natural gas are frequently seen, with mud volcanoes which indicate the escape of the gas in large quantity.

The most northerly of these anticlines, yet definitely recognized, comes in the west coast at the town of San Fernando

where a hill rises to a height of about 600 feet above the sea. On both sides the oil-bearing sandstones are exposed dipping generally to north and south and in the back streets of the town itself outflows of asphalt are seen which represent the crude petroleum which has been deprived of its volatile matter through oxydation. This oil has originally been derived from the oil-sands in the vicinity, some portions of the formation being fairly saturated with it. This anticline, like the others, extends across the island to the east coast.

The second anticline, going south, extends from the west coast at Point La Brea, about 15 miles west of San Fernando. On this is situated the famous Pitch lake, which is one of the most wonderful features of this island. Oil is also issuing from the rocks along the course of the anticline at a number of points, and deposits of asphalt are found at intervals. An old oil well near the lake, though nearly choked up, is still discharging petroleum by simple overflow.

The third anticline extends from near Guaypo point, about five miles south of the La Brea Pitch lake, eastward to the east coast, and is well defined at a number of places. At the outcrops on the west coast the strata are vertical for several hundred yards and the blackish-grey sandstone is, in places, saturated with oil which oozes out and forms a scum along the beach, while heavy outflows of the ashpalt are seen both along the shore and at many points inland along the course of the anticline. Near the west end a very strong English company, comprising Lord Dundonald and others, has recently begun a systematic series of borings for oil with every prospect of success. At or near the village of Fyzabad, about 12 miles inland, there are other large outflows of asphalt associated with thick black oil which forms small pools, the surface over a considerable area being covered with the oil and asphalt.

The fourth and most southerly anticline keeps along the south coast, terminating westward near the south-west corner at Icacos point and sometimes extending out to sea for short distances. It comes to the south-east corner of the island at Guayaguayare near Point Galiota. At the western end pits sunk for a few feet through the overlying sand into the oil-bearing sandstone soon become partly filled with oil which is derived from the sandstone formation below. This has not yet been tested by boring, but the indications for finding oil in this place are undoubtedly very favourable. All along the exposed course of this anticline to the eastern point similar occurrences of oil are seen and mud volcanoes are observed which indicate the explosive nature of the contained gas in subterranean reservoirs, with oil

springs at intervals and saturated layers of sandstone. At the eastern portion a number of borings have been made to depths of 800 to 1,000 feet, in nearly every one oil being found sometimes in large quantity. This field is now being exploited rapidly with every appearance of success.

Borings along the east coast at several points have also disclosed the fact that oil will be found in economic quantities at widely separated locations, one of these near the beach on the east coast, merely a trial hole, apparently having yielded according to the Government report at the rate of 60 to 70 barrels per day. More recent borings at Guayaguayare have made returns of oil at the rate of 12 to 15 barrels per hour. None of these wells are gushers, but the oil rises to near the surface and can be easily pumped.

These borings, made at somewhat widely separated points in the southern portion of the island, point conclusively to the assumption that oil fields of very great economic value exist in this area, and require only the judicious expenditure of capital to ensure satisfactory returns. In geological horizon the rocks are similar to those of the celebrated oil-wells of Baku in southern Russia and of Texas and California in the United States. They are of somewhat higher horizon than those of the Florence field in Colorado, which are apparently in Cretaceous rocks, but very similar to those of Burmah in the East Indies. They differ markedly from those of Canada and of the eastern United States, in which countries the oil is obtained from formations ranging downward from the Devonian to the Trenton limestone.

The Pitch lake of Trinidad, to which reference is often made, is a feature of great scientific interest. It has been visited by several scientists and various opinions have been expressed as to its origin, some contending that the surface especially in its central portion is soft and the asphalt hot, connecting its presence with volcanic phenomena. In point of fact the surface of the lake is hard and smooth, except for the presence of numerous fissures which traverse it, and are filled with water, and for the growth of trees which have evidently taken root in drifted areas of sand along such fissure lines in which seeds from the surrounding forest have lodged and taken root.

The lake itself is a vast body of asphalt, brownish-black in colour, with an area of nearly 140 acres. It is located near the west coast at Point La Brea at an elevation of about 100 feet above the sea level and at a distance of nearly one mile from the shore. In outline it is roughly circular, is deepest near the centre where a boring of 175 feet failed to touch the bottom, and gradually shoals towards the shores, having the character of a

deep circular basin. By some it is supposed to owe its presence to the action of a mud volcano, and the crater-like aspect of the lake itself supports this view. By others the opinion is expressed that it occupies the denuded crest of the La Brea anticline at this point and that the crude petroleum has gradually flowed into the denuded area, from the surrounding strata of oil-bearing sandstone, the volatile matter has been oxydized, and the remaining asphalt now forms the lake. In the one case the denudation is supposed to be caused by the agency of a gas explosion as with ordinary mud volcanoes, in the other case it would probably be caused by atmospheric agencies since it cannot be supposed that glacial action was ever experienced in these southern islands. The origin of the pitch or asphalt is without doubt due to the oxydation of the crude petroleum which flowed into the present depression from the surrounding rocks.

It was long supposed that the level of the lake was constant, but when mining began on a large scale a careful series of levels and other measurements was commenced. In this way it was ascertained that in the 14 years during which mining has been vigorously carried on the level of the surface has been lowered seven feet, or at the rate of six inches per year. In this period it is estimated that about 1,500,000 tons of the asphalt has been extracted and shipped.

The surface is hard, and the asphalt is mined with an ordinary pickaxe, the mineral breaking out readily with a sharp line of fracture. It is loaded into tram cars and either sent to the shipping point by a line of cable tram to the pier, or hauled along a second tram line by mules to the shipping point or to the boiling works where it is purified by the removal of the contained water and of a certain amount of both organic and inorganic impurity. The digging is made to a depth of one to two feet, when the tram line is moved along the surface, but in a few weeks the depression thus made is filled and the surface is again level. There appears to be a certain slow movement going on which affects the greater part of the mass, and lines of flowage are seen in the apparently solid mineral as if the whole mass were in motion from the surface downward. This movement is apparently due to convection currents, which may be caused by the displacement of the whole mass through mining or possibly to the still further and continued inflow of semi-liquid pitch from the sides or bottom of the lake basin.

From the original lake basin immense quantities of the asphalt have been discharged seaward to the shore where along the beach it now extends for more than a mile. This beach asphalt contains a somewhat larger percentage of impurity than

that of the lake, since it has evidently picked up certain inorganic as well as organic substances in its passage from the lake to the sea, the movement having apparently been made when the mineral was in a somewhat plastic condition. In composition the asphalt contains about 40 to 50 per cent. of bitumen, about 50 per cent. of water, the remainder consisting of the impurities mentioned.

The mines of manjak, located near San Fernando, are also exceedingly interesting. The mineral is also an altered petroleum, and now occurs in fissures which traverse the shales and sandstone of the oil-bearing series in the same way as the albertite mines in New Brunswick have been formed. Their position is near the crest of an anticline, and the fissures have been formed in the period of disturbance or crushing by which the anticlinal folds were produced.

The mineral manjak is a very pure variety of asphalt, carrying from 90 to 95 per cent. of bitumen. A certain amount of impurity is found in the form of clay particles, evidently detached from the sides of the fissures in the process of vein formation. It is jet black, glossy, and brittle, and can be lighted in the flame of a match, dropping like sealing wax and taking readily the impression of a seal. In this respect it differs somewhat from New Brunswick albertite which does not fuse readily, but splinters on the application of heat. Manjak is largely used in the manufacture of high grade black varnishes, insulating paints for electric conductors, waterproof paints, etc. The veins vary greatly in size, the principal one worked having increased from a width of about seven feet at the surface to over 30 feet at a depth of 200 feet. Much of the mineral in the upper 100 feet is what is known as columnar, as if the vein matter had been shattered by pressure, but at lower depths the massive form comes in and forms the greater portion of the deposit. In its conchoidal fracture it resembles strongly the albertite of New Brunswick as also in general aspect. The difference in the mineral is apparently due to metamorphism on the part of the latter, which occurs in Devonian rocks while the manjak is found, both in Trinidad and Barbados in the soft Tertiary clays and is comparatively unaltered from its pitch condition, in this respect presenting analogies to anthracite and lignite in the coal series. The limit of the veins in depth has not been ascertained at any one point, with one exception in Barbados where in a shaft at a depth of 150 feet the manjak became soft and soon passed into a thick, asphaltic oil which could be removed by bailing. The Barbados mineral is somewhat purer and apparently softer than that of Trinidad and commands a higher price in the market, some portions of the output realizing as

much as $75 to $90 per ton in the English market. It will be seen, therefore, that this mineral has a high economic value, and with the increase in the demand should form a very important article of commerce. The albertite of New Brunswick, of which some 250,000 tons were mined before the vein matter was exhausted, was used largely for mixing with ordinary bituminous coals in the manufacture of gas, possessing the property of keeping the production at a high standard.

It can be readily seen, therefore, that the island of Trinidad possesses great resources in the matter of asphalt, manjak and petroleum, which are now coming into prominence and will undoubtedly, in a few years, become a great source of wealth to the investors and of revenue to the government, since the development work already done is most encouraging.

The crystalline schists of the northern range are also well worthy of careful exploitation. The indications of gold in the numerous quartz veins already observed, and of iron ores of several kinds are important, but so far but little attention has been directed to this formation. Nowhere in this island was any indication of volcanic rocks observed either in loose pieces or in actual outcrops.

In Barbados the geological formations are somewhat different. Of the 166 square miles in the area, six-sevenths are occupied by coral limestone, which doubtless at some time formed a complete capping over the whole island. This coral formation reached to the highest points of the island, or about 1,100 feet above the sea, though to the ordinary observer or visitor the island is usually regarded as of but small elevation. The remaining seventh in the north-eastern portion shews a series of Tertiary sediments which are almost identical with those seen in Trinidad, and like that island, contain petroleum and manjak in large quantities. They have been exposed by the denudation of the overlying coral, which presents bold escarpments facing to the east. Between the Tertiary rocks and the coral is a considerable thickness of earths and clay deposits with an aggregate thickness of nearly 300 feet, which, with the overlying coral formation, are quite undisturbed.

The Tertiary oil-bearing sandstone and shale are more highly disturbed than those of Trinidad, the anticlines being sharper and the strata in places overturned for short distances. As in Trinidad, boring for oil has been carried on for some years as well as mining for manjak, and some fifteen holes have been sunk, several of which have been carried to depths of over 1,000 feet. In most of these oil has been found in some quantity and a pipeline and refinery were erected several years ago, the oil being

pumped from the wells to the height of land whence it descended by gravity to the refining works near the city of Bridgetown. In certain cases the location of the borings was unsuitable, the sediments being too greatly disturbed to be largely productive of oil, so that the yield of petroleum in economic quantity has not been satisfactory; but at other places the conditions are more favourable, the strata being more regular and less broken, while beneath the coral and clay formations, the latter being known under the name of "Oceanic beds," the oil-bearing Tertiary probably occurs throughout the whole extent of the island. Here also, owing to the covering of impervious clays, the possibility of finding oil in paying quantity should be more favourable than in those portions where the clay and coral formations have been removed, as in the north-eastern portion. The thickness of the coral formation varies from a few feet only to 200 feet, and in some places possibly 250 feet, and the Tertiary rocks are sometimes seen owing to the denudation of the coral, more especially in the southern and northern portions of the island. The judicious expenditure of a certain amount of capital by boring in this coral-capped area should be carefully considered.

In the Oceanic, or clay and earthy deposits, are large beds of infusorial earths, often beautifully white and resembling the infusorial earth obtained from the beds of lakes in eastern Canada. The microscopic examination of the contained foraminifera, however, shews that the forms are of deep sea water types, instead of fresh water origin, as is the case in the northern lake deposits. These infusorial earths should, at some time, be of economic importance. No trace of volcanic rocks are seen in this island.

The manjak deposits of Barbados occur in true fissure veins as in Trinidad, the fissures undoubtedly being formed during the general period of upheaval which affected the Tertiary oil-bearing sands. The origin of this mineral is clearly seen in the case of the shaft referred to where the manjak passed down at 150 feet into petroleum. The inference is that this petroleum has flowed into the fissures thus formed, either from the sides or bottom, from the oil-sands which have been thus traversed; the volatile matters have been largely removed by oxydation, and the asphaltic portion has remained as a vein filling. Apparently similar conditions affected the albertite deposits of New Brunswick.

# DESCRIPTION OF A CANADIAN SPECIES OF PELTOCERAS.

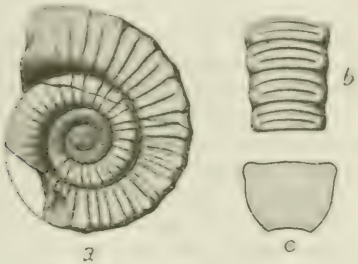
BY J. F. WHITEAVES.

The genus *Peltoceras* was constituted by Dr. Waagen for the reception of certain Jurassic Ammonites from Europe and India, that are most closely allied to *Aspidoceras* and *Perisphinctes*. A "short diagnosis" of this genus was published in November, 1871, in the fourth part of the fourth volume of the Records of the Geological Survey of India. And, under the auspices of that Survey, a much fuller description of the generic characters of *Peltoceras* was published in 1875, in the first volume of the "Jurassic Fauna of Kutch." In the latter publication Dr. Waagen makes the following remarks: "Most essential for the generic determination of the shells I place under the name of *Peltoceras* is the form of the earlier stages of growth, which is characteristic to a high degree, and varies but very little in most of the species. The strong, sharp, mostly dichotome, but sometimes also undivided, ribs, which cover the inner whorls of those Ammonites, cannot be easily mistaken, and serve well to recognize the genus, even in specimens where other characteristics are not observable. The whorls are always very little embracing, and the transversal section of the latter somewhat rectangular." The genus is divided into three sections, viz.: (1) The group of *Ammonites annularis*, Reinecke; (2) the group of *A. Eugenii*, Raspail; and (3) the group of *A. athleta*, Phillips.

In the summer season of 1906, Mr. D. B. Dowling found a small Ammonite, which seems to the writer to belong to the genus *Peltoceras* and to the group of *P. athleta*, in rocks of mesozoic and presumably of Jurassic age, on the Red Deer River, Alberta, at the Rocky Mountain Park. This little Ammonite is not more than an inch and a quarter in its maximum diameter, and represents only the early stage of growth of the shell, but that, as Dr. Waagen states, is highly characteristic in the genus *Peltoceras*. The sutures of its septa are not preserved, but the outline of its transverse section, and its surface ornamentation, are essentially similar, in a general way, to those of the corresponding stage of growth of *P. athleta*, as figured by d'Orbigny, under the name *Ammonites athleta*, on Plates 163 and 164 of the "Atlas" to the first volume of the "Terrains Jurassiques." This Canadian *Peltoceras*, however, seems to be specifically distinct from

*P. athleta* and other known species of the genus, and may be provisionally named and described as follows:—

PELTOCERAS OCCIDENTALE, sp. nov.




*Peltoceras occidentale*; *a*, side view of the only specimen collected; *b*, portion of venter of the same, showing four primary bifurcating ribs, alternating with four secondary simple ones; *c*, outline of transverse section of the outer volution of the same, near the aperture. All the figures of the natural size.

Shell widely but very shallowly umbilicated on both sides, the umbilicus occupying fully two-thirds of the entire diameter.

Whorls slender, increasing very slowly in size, in close contact throughout, but without embracing, flattened and widest on the venter (as shown in figure *c*) angulated at its junction with each side, and narrowing convexly and somewhat obliquely inward, to the rather narrow dorsum, which is impressed longitudinally by a very shallow furrow of contact.

Test unknown; surface of the cast of the interior marked with numerous, nearly straight transverse ribs. On each of the sides all the ribs are simple and unbranched (as shown in figure *a*) which represents one of the sides. But, at the ventrolateral angulation on each side of the outer whorl, each primary rib swells into a comparatively large, circular and flattened tubercle, then bifurcates (as represented in figure *b*) or trifurcates in passing over the venter, and finally coalesces with a similar tubercle on the ventrolateral angulation of the other side. The secondary ribs are as long as the primaries, but the former are neither tuberculated on the outer margin of the outer whorl, nor divided on the venter, though they are not infrequently interrupted in or by the close proximity of a tubercle on one of the alternating primaries.

Sutural line unknown.

Maximum diameter of the only specimen known to the writer, thirty millimeters; that of the umbilicus, from suture to suture, twenty-one millimeters.

Red Deer River, Alberta, at Rocky Mountain Park, D. B. Dowling, 1903; the small specimen figured, which shows the characters of three of the outer whorls, the nuclear ones not being preserved.

In the correspondingly early stage of growth of *Peltoceras athleta*, as figured by d'Orbigny, the primary ribs have not begun to develop well defined tubercles, and they bifurcate from near the middle of each side of the outer volution.

Dr. Waagen says that a specimen of *Peltoceras annulare* or *athleta* has been found in the "vicinity of Mombas, equatorial Africa," so that the genus is now known to be represented in the mesozoic rocks of Europe, Asia, Africa and North America.

As *Peltoceras* is regarded as an exclusively Jurassic genus, it would seem most probable that the rocks at Rocky Mountain Park from which the type of *C. occidentale* was collected, are of Jurassic age. On purely palæontological grounds, also, it would seem highly likely that those presumably Jurassic rocks in Alberta which hold *P. occidentale* are of about the same age as the coarse grits from the Crow's Nest coal fields near Fernie, B.C., which hold *Cardioceras Canadense*, and as those Jurassic rocks in the Black Hills of Dakota which hold *C. cordiforme*. In a Bulletin of the American Museum of Natural History, New York, published on December 17th, 1906, Professors Whitfield and Hovey have shown that *C. cordiforme* is a very variable species, especially in the adult state, and it is just possible that *C. Canadense* may prove to be only a local variety of that species. However that may be, it is abundantly clear that both *C. cordiforme* and *C. Canadense* are very closely allied to the British and European *C. cordatum*.

OTTAWA, July 12th, 1907.

## THE SECOND CHAPTER IN THE STORY OF THE MIGRATION OF BIRDS OF THE PAST SPRING.

By G. EIFRIG

In the May number of the "Naturalist" the present writer published an account of the remarkably early appearance of some of the bird migrants in this vicinity, when there was nothing here whatever to tempt them to come earlier, together with the probable reasons for this phenomenon. Appended was a list of 29 species, that were the firstcomers this spring. That was, if you please, the *first* chapter in the story of the past season's migration. It was an auspicious and promising looking one. However, the end in the migration did not bear out the promises of its beginning. The second chapter is an unsatisfactory, yes, even a melancholy and sad one.

When May, the principal migration month, came, it came not as usual, smiling, laden with fresh green leaves and blossoms; but darksome, gloomy, with lack of sunshine and warmth. The violent snowstorm on May 4th, leaving about six inches of snow on the ground, was but a foretaste of what was to come. Such extraordinarily cold weather had not been recorded in May for many years. There were heavy frosts at night, and occasional slight snow flurries as late as the 28th. Nor were we here the only sufferers from this winter weather in May. It is recorded as the coldest May for 35 years at Washington, and at Detroit, Fort Wayne, Ind.; yes, even at St. Louis, where the writer had occasion to go in May, conditions were the same. To see furs worn in May is certainly a novel sight for St. Louis, but it was a very common one this year.

The effect of this on plant and animal life was naturally a very marked one. Vegetation practically remained at a standstill throughout May. The buds that were on the trees in the beginning of May remained unopened until almost the end, the trees were nearly bare. Insect life was correspondingly kept back. Mosquitos, flies, etc., were few and far between, also the numerous small insects frequenting the newly opened blossoms and leaves. And the effect of all this on birds was simply disastrous. The arrival of most species was very considerably delayed, as the list given below shows. For instance, the chimney swift, 1906, April 30; 1907, May 10; house wren, May 2–9; spotted sandpiper, May 2–19; yellow warbler, May 4–13; bobolink, May 5–18; black-throated green warbler, May 7–16; parula warbler, May 7–15. The least flycatcher, whose note *chebec*, from which it also gets a name, can be heard in trees of our streets as soon as it arrives, came in 1906, May 11th—which already was

later than usual—but this year it turned up only on May 15th, and then one or two half-hearted specimens only. The tiny hummingbird, due here between May 10th and 15th, was this year not recorded by the writer before May 30th. The wood pewee, with the chebec, a common breeder in our city shade trees, who also unmistakably betrays his presence as soon as here, came this year only on June 1st, other years it is here May 17th. The last regular migrant in these parts, who comes here in numbers, and whose presence can not be overlooked owing to his unique call or song, is the blackpoll warbler. Their advance guard usually arrives about May 20th but this year not before the 31st. Thus the uncongenial climatic conditions delayed these 11 species from four to seventeen days, an average of 10 5-11 days. Other years the days about May 23rd produce the largest waves of migrants, but this year the first large wave struck the gardens along our city limits on May 29th, thus showing a delay, if looked at from this standpoint, of six days.

Another notable factor is the decrease in numbers. The first arrivals of the above mentioned species were mostly single birds or at least in lesser numbers than in other years. And, whereas, in other years, the species given above become common in most cases two or three days after their advance guard has arrived, this was not the case during the last cold May. The first comers were, in many instances, the sole representatives of their species, in fact, some were seen and then not again for many days. Of course, in most cases, the normal number was reached by late and numerous accretions, but in many instances the usual abundance was never reached. This holds good in the case of the chimney swift, brown thrushes, whippoorwill, hummingbird, scarlet tanager, and very noticeably so in the case of the blackpoll warbler. Of course, there were nevertheless large waves of warblers in certain restricted localities during the last few days in May, and some who happened to get amongst them would say that they had never seen so many birds, etc., but I am convinced that there is not nearly the usual number of warblers, especially here, this summer. So, admitting the great mortality which decimated the ranks of the warblers fearfully after they did come here, also the possibility of many having retraced their steps for a little distance to the south—that the tree swallows did this earlier in the season, I am almost positive—still the fact cannot well be contraverted that the exceptional cold in May did decrease the numbers of migrants to some extent, in many cases seriously so.

But nature often likes to upset pet theories, often very elaborate ones, so there are also some exceptions to these two

stated effects of the coldness in May. Thus, for the scarlet tanager, I have a record of two days earlier than last year; the nighthawk came on the 16th as usual as though there was no cold weather and dearth of insects. Again, the spotted sandpiper was unusually abundant in June. The purple martin seemed more numerous than usual for a while, the olive-backed thrush was decidedly commoner than usual, and on May 19th, Mr. A. Kingston found the black-throated blue warbler exceedingly numerous in Dow's Swamp, their numbers equaling those of all other birds combined, while a half dozen or so, at most, is the usual number seen together when the migration is normal and at its height. The cedarbird, usually here in March, was not seen by the writer till June 7th, but was in its usual abundance and superabundance in July. And it is just these variations from one year to another, these continual apparent anomalies and surprises that make the work of the ornithologist so interesting and fascinating.

And now comes the harrowing part of the story. The coldness of the season caused a deplorable mortality among birds, especially warblers and swallows. Vegetation was, as already stated, at a standstill for weeks; therefore, the insects, plant lice, etc., that abound on the leaves of trees; moths, gnats, etc., that usually fly about at that time, were absent. On that account there was great suffering among the insect-eating birds that had come, most acute among warblers. They could be seen everywhere, apparently in great distress, wings half opened, often too weak to fly, looking for morsels of food in places where they are otherwise not seen. I saw Canadian and Blackburnian warblers searching for food among tin cans and refuse heaps, on roadsides, unable to fly. A beautiful Cape May warbler, the only one seen by the writer, against dozens other years, was skulking along the fence of a disreputable looking dog pound. The Blackburnians seem to have been the greatest sufferers. Several dead warblers, two tree swallows, a brown creeper, were brought to me by school children, others were brought to the museum, three Blackburnian warblers were found dead by a friend at Germanicus, Renfrew County, and farmers and their children at this place, also at High Falls, Quebec, all told the same story. Some had found two, others as many as five dead warblers; at least, according to the descriptions given, they belonged to this family. I found a dead Blackburnian warbler on the banks of the Lievre River at High Falls, where, according to the testimony of a farmers' family, they had been very common in May, some not able to fly away and a number found dead. At Germanicus a strange incident was observed. On a farmer's bridge through a swamp a myrtle warbler was in its last agonies, when a robin

came and tried to carry it away. Why?

Now it is safe to assume that for every bird found dead, hundreds, if not thousands, are not found, showing a consequence of the backwardness of the season, that may well stagger a nature lover.

Another and very curious effect of this lack of food in the accustomed places was the apparent change of habit it induced some species to adopt, the warblers again being the most affected. If a person had begun the study of birds, or at least of warblers, this spring, near here, he would have formed many an erroneous opinion, and yet would have had observed facts to base them on. He would *e.g.* not have had any hesitancy in stating, that most warblers were ground loving birds, looking for their food on the grass. For this is precisely what the yellow, Blackburnian, Canadian, and other warblers could be seen doing day after day in May. During a walk on the 20th, I saw 10 to 15 yellow warblers, all on the ground or on old weed stalks, etc., not far above it. The same was told the writer by farmers in Renfrew County, by a returned lumberman from Lake Kippewa, who said that on every small spot of grass in the woods or on the farm, these little "black and yellow," etc., birds, that they had "never noticed before" were abundant. They were very tame, too, allowing one to catch them, caused, as already indicated, by their starved condition. On May 4th, after that great snowstorm, four hermit thrushes came out of the pines on the veranda of Mrs. Brown's residence, Ottawa East, to within three or four feet of Mrs. Brown and Miss Lees, who were standing in plain sight of them on the inside of a window, which shows much more tameness than this species usually shows. Another curious change of habit could be observed in the myrtle warbler. It was almost invariably to be seen in cat-tail swamps, where, however, no sign of new growth was yet to be seen, darting over the water, most probably after the few flies, etc., there, in the most approved flycatcher style. A beginner would have undoubtedly classed the myrtle warbler as an exclusive swamp bird. Altogether, judging from the number of yellow and Blackburnian, etc., warblers at the edge of rivers and pools, that must be the last place where insects can be found when absent everywhere else.

Nesting was naturally also greatly affected. The delayed arrival of many species would, of course, also postpone the time of nesting. Even such that were here on time, or even earlier than usual, like the robin and red-winged blackbird, delayed nest-building in many instances, owing probably to the fact that the leaves and cat-tails were so late coming out, which would have left their nests too much exposed. This must have been a considera-

tion with the robins at least, for never have I seen and heard of so many nests of robins built on houses, under verandas, over doorsills, etc., and that in places where trees are plentiful.

Finally the untowardliness of the season caused some species to remain with us a much shorter time than usual. They delayed coming to us longer than under normal conditions, and, wanting to get to their breeding ranges at the usual time, they had to cut short their sojourn here. This was the case with the rusty grackle and the white-crowned sparrow; the tree sparrow too was not seen by most observers, and the blackpoll warblers, while a few single individuals were seen much later than usual—I observed one at High Falls, Que., as late as June 12th—made the total length of their stay shorter than otherwise, owing to their much later arrival. Bay-breasted, Tennessee and blackpoll warblers, olive-backed thrushes and pine siskins were seen and heard in full song as late as June 7th at Major's Hill Park, which will probably not happen again for years.

I add a comparative list, which begins where the one in the May number left off, with April 22nd.

| | 1907 | 1906 | 1905 |
|---|---|---|---|
| Yellow-bellied Sapsucker | April 27 | April 15 | April 10 |
| Downy Woodpecker | " 27 | " 8 | " 11 |
| Purple Finch | " 27 | Mar. 29 | Mar. 1 |
| White-throated Sparrow | " 28 | April 15 | April 23 |
| Ruby-crowned Kinglet | " 28 | May 1 | " 27 |
| Myrtle Warbler | " 28 | " 2 | May 1 |
| Purple Martin | " 29 | April 22 | April 23 |
| Whippoorwill | May 5 | May 1 | May 5 |
| House Wren | " 9 | " 2 | April 28 |
| Chimney Swift | " 10 | April 30 | May 2 |
| Black and White Warbler | " 10 | May 4 | April 28 |
| Woodcock | " 11 | " 11 | |
| White-crowned Sparrow | " 13 | " 16 | May 6 |
| Yellow Warbler | " 13 | " 4 | " 1 |
| Blackburnian Warbler | " 13 | " 10 | " 1 |
| Rose-breasted Grosbeak | " 13 | " 13 | " 11 |
| Brown-breasted Nuthatch | " 13 | Mar. 10 | Mar. 1 |
| Bank Swallow | " 14 | May 13 | May 18 |
| Redstart | " 14 | " 15 | " 5 |
| Waterthrush | " 14 | " 11 | " 8 |
| Kingbird | " 14 | " 7 | " 5 |
| Baltimore Oriole | " 14 | " 13 | " 6 |
| Ovenbird | " 14 | " 13 | " 6 |
| Canadian Warbler | May 15 | May 19 | May 12 |
| Parula Warbler | " 15 | " 7 | " 10 |
| Black-throated Blue Warbler | " 15 | " 7 | " 10 |

| | 1907 | 1906 | 1905 |
|---|---|---|---|
| Goldfinch | May 15 | April 17 | Mar. 13 |
| Least Flycatcher | " 15 | May 11 | May 5 |
| Nashville Warbler | " 15 | " 7 | " 7 |
| Magnolia Warbler | " 15 | " 16 | " 10 |
| Veery | " 15 | " 6 | " 6 |
| Wilson's Warbler | " 15 | " 21 | " 19 |
| Scarlet Tanager | " 15 | " 17 | " 14 |
| Nighthawk | " 16 | " 16 | " 14 |
| Warbling Vireo | " 16 | " 6 | " 10 |
| Bay-breasted Warbler | " 16 | " 16 | " 19 |
| Red-eyed Vireo | " 16 | " 15 | " 6 |
| Black-throated Green Warbler | " 16 | " 7 | " 1 |
| Tennessee Warbler | " 16 | " 17 | " 24 |
| Cape May Warbler | " 16 | " 12 | " 22 |
| Olive-backed Thrush | " 16 | " 13 | " 16 |
| Northern Yellowthroat | " 16 | " 11 | " 4 |
| Catbird | " 17 | " 15 | " 6 |
| Chestnutsided Warbler | " 17 | " 13 | " 7 |
| Bobolink | " 18 | " 5 | " 2 |
| Crested Flycatcher | " 19 | " 11 | " 12 |
| Blue-headed Vireo | " 19 | " 15 | " 7 |
| Cliff Swallow | " 19 | May 9 | May 17 |
| Rusty Grackle | " 19 | " 7 | April 10 |
| Spotted Sandpiper | " 19 | " 2 | May 4 |
| Sora | " 19 | " 8 | |
| Solitary Sandpiper | " 20 | " 18 | |
| Swamp Sparrow | " 20 | April 18 | May 8 |
| Bittern | " 20 | " 16 | April 24 |
| Gray-cheeked Thrush | " 23 | | May 14 |
| Alder Flycatcher | " 24 | May 19 | " 24 |
| White-breasted Nuthatch | " 24 | April 4 | |
| Mourning Warbler | " 29 | May 19 | May 12 |
| Red-headed Woodpecker | " 29 | " 26 | |
| Blackpoll Warbler | " 31 | " 21 | May 17 |
| Pewee | " 31 | " 17 | " 4 |
| Hummingbird | " 30 | " 15 | " 11 |

Note that in the list for 1907 there is only one species recorded between April 28th and May 9th, the whippoorwill, while in a chronologically arranged list of 1906, there are 23 species recorded as having arrived, three on the 1st, three on the 2nd, three on the 4th, two on the 5th, three on the 6th, and seven on the 7th. Of rare species like the Tennessee warbler, the dates given above are not conclusive, they may have been here for days before, but escaped observation.

OTTAWA, August 14th, 1907.

# THE OTTAWA NATURALIST

VOL. XXIV. OTTAWA, SEPTEMBER, 1907 No. 6

## THE SPRING MIGRATION ON THE BRUCE PENINSULA.

BY A. B. KLUGH, KINGSTON, ONT.

It has appeared to me for some years that the Bruce Peninsula, Ontario, should be a migration route for the birds of the country lying north of Lake Huron. This year (1907) I spent from April 27th to June 21st at the base of the peninsula investigating the avifauna of that district. I made my headquarters at the village of Colpoy's Bay, three miles above Wiarton. From here I made frequent trips across the peninsula which is, at its base, some seven miles wide.

The east shore is fringed with limestone bluffs some 160 to 250 feet in height, while the west shore is low and sandy.

The avifauna is very similar all across the peninsula, the only difference being that along the Pike River, near the middle of the peninsula, there are marshes, and at Oliphant on the west side there is a huge sandy bog and in these localities the Maryland yellow-throat, swamp sparrow and alder flycatcher which do not reside on the east coast, breed

Just below the village of Colpoy's Bay, between the limestone bluffs and the shore, is a bush some 1½ miles long by about 100 yards wide in most places, consisting largely of cedar (*T. occidentalis*), balsam (*A. balsamea*), white spruce (*P. alba*), paper birch (*B. papyrifera*) and balsam poplar (*P. balsamifera*). Into this bush all the birds travelling up the east shore seemed to pitch. Above the village between the bluffs and the shore, the bush consists mostly of paper birch with some poplar (*P. tremuloides*) and balsam poplar, and though this looked to be good "bird-country" birds were comparatively scarce here during migration.

When I arrived on April 27th, only the early migrants had yet arrived, *viz.*—robin, blue-bird, song sparrow, bronzed grackle, purple finch, red-winged blackbird, rusty blackbird, slate-colored junco, flicker, prairie horned lark, hermit thrush, white-throated sparrow, fox sparrow, and vesper sparrow.

On the night of April 29th and the morning of the 30th, a foot of snow fell. This drove a host of birds into our barnyard to seek for food. In the barnyard and in cedars about the house were some 200 juncos, 150 fox sparrows, 100 white-throats, 50 song sparrows, many robins, several bluebirds, tree sparrows and prairie horned larks and a hermit thrush. Many of the juncos were in the barn and some even in the woodshed.

The fox sparrows, white-throats and song sparrows kept up a regular chorus. I had never heard fox sparrows in full song before. Their song is a clear, rich, very sweet warble, usually delivered from a branch some 20 or more feet from the ground. For the first three days of May fox sparrows were abundant, and I saw the last on May 7th. From the large numbers seen it is evident that the Bruce Peninsula is a migration highway for this species.

The weather remained cold up until May 13th, and the birds dropped in very slowly as follows:—

May 2nd: Barn swallow, kingfisher and winter wren. May 3rd: Towhee and myrtle warbler. May 7th: Brown thrasher, yellow-bellied sapsucker, chipping sparrow and Savanna sparrow. May 9th: Tree swallow, pine warbler and palm warbler. May 10th: Black-throated green warbler. May 11th: Black-and-white warbler and ruby-crowned kinglet. None of the warblers were seen in any numbers and the myrtles were observed only in small flocks of three or four or as single birds and were usually flying over.

On May 13th it was evident that an immense bird-wave had come in during the night. Birds were everywhere and the bush below the village was full of them. They appeared to pitch into this bush during the night, travel up the bush and a fringe of cedars as far as the village and then back again until, about noon, they reached a stream about the middle of the bush. Here they drank and caught the insects which were apparently more abundant here than elsewhere. The new species which came in with this wave were the Nashville warbler, yellow warbler, Magnolia warbler, Blackburnian warbler, chestnut-sided warbler, ovenbird, Baltimore oriole and red-breasted nuthatch. With these were a host of myrtle, black-throated green and black-and-white warblers.

That night another large wave came in and next day I saw the woodcock, greater yellow-legs, lesser yellow-legs, white-crowned sparrow, kingbird, least flycatcher, bobolink, house wren, red-headed woodpecker, water-thrush, Wilson's thrush, catbird, crested flycatcher American pipit, blue-headed vireo, and ruby-throated humming bird. All these species which came in on these two waves were from one to three weeks late.

On May 15th, I saw the wood thrush, redstart, chimney swift and solitary sandpiper and on the 16th the Parula warbler, Cape May warbler, black-throated blue warbler and the Canadian warbler.

On May 17th the scarlet tanager, and bay-breasted warbler came in, on the 18th, the grey-cheeked thrush, on the 23rd, the

olive-backed thrush, on the 27th, the cedar wax-wing, and on the 29th, the olive-sided flycatcher.

On the first of June the migration was still in full swing, and on that date male black-poll warblers were common, on the 3rd I saw the red-eyed vireo and the Philadelphia vireo, and on the 5th, the Tennessee warbler, Wilson's warbler, indigo bunting and nighthawk. The migration came to an end on June 8th.

Species which were more abundant than I have found them elsewhere in spring were the black-poll warbler, bay-breasted warbler, Blackburnian warbler, red-breasted nuthatch, white-crowned sparrow and olive-backed thrush. On five days in May these last-mentioned birds were very common and I took several, while I only secured one grey-cheeked thrush.

This spring I took three Cape May warblers. This bird, which was regarded some years ago as very rare, is undoubtedly becoming commoner. I saw seven Philadelphia vireos, more than I have ever observed before during a migration.

Other interesting things taken were an adult male American redstart with the base of the tail-feathers pale yellow as in the immature male, instead of orange as they should be in the adult male; a male indigo bunting with the back still mostly brown, and a female purple finch, with some pink feathers on the throat, which was singing when taken.

All warblers were doing far more feeding on the ground and "fly-catching" this year than usual. It is probable that this was caused by the scarcity of insects this spring, the birds having consequently to work far harder than usual for their living.

In previous years I have heard the flight-song of the oven-bird only occasionally, and then usually in the evening. This spring I heard it some eighty times and at all times of the day. Once I saw an oven-bird describe an arc out over the waters of the bay while singing this exquisite song. I saw flocks of pine siskins on May 22nd and 30th and on June 2nd, 5th, 7th and 18th. The flock seen on June 2nd contained about 150 birds. This is unusually late for these birds to be in flocks, as they are as a rule breeding before this.

In the cedars about the house lived a song sparrow which sang once nearly every night between eleven and two o'clock, and a chipping sparrow which sometimes sang about the same time.

Some of the results of my work this spring which will be of use to us in making out the movements and distribution of birds in the Great Lake region are:—

(1) The Bruce Peninsula is a migration route for land birds.

(2) At the base at least, the wave of migration extends clear across the peninsula.

(3) Ducks and other waterfowl cross the peninsula at the base from east to west in the spring.

(4) The base of the Bruce Peninsula has its fauna tinged with Carolinian tendencies as shown by the common breeding of the towhee and wood thrush.

---

## A NEW MOUSE FOR CANADA.

While spending a few days at Point Pelee at the end of May, 1907, I had some traps out and succeeded in taking a few specimens of *Peromyscus Bairdi*, a mouse which appears to be hitherto unrecorded for Canada. Peromyscus is the deer mouse genus and this little fellow bears considerable resemblance to the common deer mouse of the woods, in being brownish red above and white beneath, but the brown is darker and not so reddish, and the greatest differences are in the length of ears, tail and hind feet, all of which are smaller in this species than in the common one (*Peromyscus americanus*).

The measurements of these mice do not accord exactly with those given by Dr. Elliott in "Mammals of North America." In that work *P. Michiganensis* (synonym of *P. Bairdi*) is stated to measure 165 mm.; tail vertebrae, 67; hind foot, 20.5; whereas my three fully adult specimens average, 139; 49; 16.5, and a specimen from Niles, Michigan, measures 136, 55, 18.

The habitat of this mouse, so far as hereto known, is from Michigan to Minnesota and south. Its habitat on Pt. Pelee is peculiar. On the centre and the east side of the point I found nothing but *P. americanus* while Baird's mouse was strictly confined to the sandy beach on the west side, living among the logs and other miscellaneous lumber such as are found on every beach where they have been left by high water.

I took one specimen at the edge of the red cedar thicket, but the others were taken out on open beach beside the logs. The inhabitants spoke of finding them frequently when taking wood from the beach. The common deer mouse is found in the wooded parts of the point and its range overlaps that of Baird's mouse at the edge of the wooded area, but the line of demarcation is drawn with surprising distinctness. One of the specimens taken this year has been sent to the Museum of the Geological Survey.

W. E. SAUNDERS.

# NOTES ON SOME SEAL ISLAND (YARMOUTH CO., N.S.) BIRDS.

By H. F. TUFTS.

Seal Island, situated some fifteen miles off the southwest coast of Nova Scotia about mid-way between Yarmouth on the north and Cape Sable on the south, is perhaps the most interesting from an ornithologist's viewpoint of the many islands which fringe the coast.

While some four miles long and from one half to one mile wide, the island is mostly low, in no place exceeding 30 or 40 feet above the sea. A sand beach on the east side near its middle, extends with the sweep of the storms nearly across the island, forming a lagoon and marsh, where it backs against the ridge of granite boulders and beach stones, which forms its western wall. From this low area the land gradually rises toward the north and south to the extreme ends. These portions are covered with a peaty, reddish-colored soil, supporting a dense growth of dwarf spruces and firs, in places so closely grown together as to be almost impenetrable. Under foot is a fine carpet of velvety green moss. On the south end is situated the government light station and fog-horn, in charge of Mr. John Crowell, who is also owner of the island.

This is one of the very few islands about Nova Scotia upon which various sea birds still attempt to nest and rear their young. From other islands the birds have been driven by the relentless persecution of the fishermen, who systematically rob them of their eggs or shoot without regard to season.

On Seal Island, however, thanks to the untiring efforts of Mr. Crowell and his family, the birds are in a measure protected from wanton destruction.

The most numerous and conspicuous of the birds are the herring gulls. Here we find them by thousands, perched about on the spruce tree tops, scattered about the rocky shores or winging their way over the surrounding waters in quest of food—always drawing attention by their beautiful forms and plumage and noisy voices. Their nests are scattered about the ground, both in the woods and amid the stumps of the recent clearings, or on the beach—a slight hollow into which grass and moss is scraped and the two or three eggs desposited therein. Many nests are built in the flat tops of the dense stunted spruces, bulky affairs of sticks, sea-weed and moss—crow style. These gulls prove helpful allies to the fishermen, indicating the whereabouts of shoals of fish, about which they gather in excited, eager swarms.

Some few guillemots and puffins also lay their eggs among the stones and rocks above high water on the beach. The two eggs in the case of the guillemots are well hidden at the bottom of some passage between the rounded boulders. In scrambling over these rocky portions, we startle the sitting birds from their eggs. They flutter forth and perch upon a nearby boulder, or flop into the waves, watching with outstretched necks and anxious gaze the movements of the intruder.

The peat-like turf of the elevated parts of the island was completely honeycombed with the burrows of the Leach's petrels—the air about being pervaded with the strong musky odor of the birds. The petrels themselves, however, are not to be seen at all during the day, unless you thrust your arm full length into one of the burrows and bring forth the hiding bird, probably the sitting female, whose mate is far out to sea searching its food. But it is at night the petrels make merry. With darkness the foragers return and the sitting ones sally forth. Now the air becomes resonant with their soft twitterings and cluckings, while shadowy forms flit about in every direction. The nest burrow is usually about two feet in length, just large enough to admit the birds and most often following the side of some tree root, or underground boulder. But one egg is laid, that upon the bare turf at the tunnel's end.

The half-wild cats with which the island is infested, play sad havoc with the poor petrels. Lying in wait at the entrance to the burrows at nightfall they seize upon their unhappy victims as they venture forth. Scattered feathers, wings and tails, everywhere through the woods, attest the murderous work of the cats.

Some fifteen or twenty eider ducks were spending the summer about the shore, and suspecting some were breeding, search was made among the brush for the nests. With the aid of an aged Newfoundland retriever, who picked up the trail of a duck, and led us into a tangle of bushes and weeds, we discovered one nest, thickly lined with down and containing six large, olive green eggs. Formerly these ducks nested in great abundance on Seal Island, but of late years only an occasional pair or so.

Of the shore birds, only three species were noted at that season. These were the spotted sandpiper, piping plover and semi-palmated plover; all of which Mr. Crowell has found nesting. A few terns, both the common and arctic, were nesting about the big sand flat, mere remnants of the swarms that used to nest there.

Among the small land birds of which there were many, most interesting were the Bicknell's thrushes and black-poll warblers, both fairly common and breeding. These birds, especially the thrushes, are very local in their distribution, and here good opportunities were afforded to note their habits. Like their cousins the hermit thrushes, the Bicknell's thrush sings most frequently in the early morning and late evening. Their song resembles that of the hermit in a general way, but is not nearly so clear and liquid. The nests are built at varying elevations among the dense spruces and are exceedingly difficult to find. The nests of former years, however, are much more in evidence. The moisture-laden atmosphere seems to cause them to swell and starts a growth of moss, which persisting from year to year preserves and renders them quite conspicuous.

Other small birds found breeding there were golden crown kinglets, winter wrens, Hudsonian chickadees, brown creepers, red-breast nuthatches, crossbills and several others.

During the migrations many birds make this a resting place, as also do storm-driven birds of a more southern range. Thus Mr. Crowell has taken examples of the Florida galinule, turkey vulture, scarlet tanager and Baltimore oriole. Many birds perish during the migrations by coming in contact with the great light one hundred feet up. Over eight hundred yellow warblers were thus destroyed upon one occasion in a single night.

Seal Island derives its name from the large numbers of seals that formerly resorted there to breed. The first industry of the place was the seal-fishery, the animals being of value for the oil which could be extracted from their carcases. This of course was long since overdone—now only a few scattered seals are to be seen, but great sand-covered mounds back of the beach mark the spots where the useless bones were piled. At present the island is of importance as a lobster-fishing station.

## THE AMERICAN GOSHAWK NEAR OTTAWA.

By G. EIFRIG.

The goshawk or blue henhawk (*Accipiter atricapillus*) breeds in some numbers in the vast wooded area to the north of Ottawa. It is a large hawk measuring two feet from bill to end of tail, the wing expanse being three to four feet. It is a beautifully marked hawk. The adults of both sexes are bluish-slate color above, the under parts white, each feather being pencilled with black, producing a fine effect. The young ones are entirely different, brownish-black with some rufous above, and the feathers below being heavily *streaked* with black, not *barred* as the adults. Last fall they were quite common for a while around the city. Their flight is not the slow gliding of the buzzard genus. They fly low and swift and fall on their prey like thunderbolts, and when people come out of the house to look for the miscreant who carried away their chicken, they may happen to see a red-shouldered hawk gliding around above, and, taking him to be the author of the mischief, will vow vengeance, whereas the real author, the goshawk, or perhaps Cooper's hawk, who looks and acts much like him, is far away by this time, enjoying his meal. They are quite fearless, often carrying away chickens or game from the very feet of the husbandman or hunter. They would be real harmful to farmers and poultrymen were they not so rare in settled districts. But for what damage the quick-flying *Accipiters* do, the slow-gliding useful buzzards, *Buteo*, are blamed and punished, as the red-shouldered, red-tailed and broad-winged hawks. Of the accipitrine hawks, which closely approach the falcons in build, rapacity and swiftness, we have only the goshawk, Cooper's and the sharp-shinned hawk, of which only the last is at all common, and he is too small to do much harm to man. He confines his depredations to small wild birds, where he does much harm. In winter he sometimes enters cities, as three winters ago Ottawa, and makes himself useful to the community by doing away with an enormous number of English sparrows.

The following two incidents, which came under the writer's notice, show the fierceness of the goshawk. About May 15th, 1905, Mr. F. Sack, a farmer of Germanicus, Renfrew Co., went into one of his fields, which he had not visited for a while. Suddenly a large hawk swooped down upon him, sailed around him in uncomfortably close proximity to his head, struck at him with his claws, and all this with such fierceness that progress was impossible. He had to turn back. The next day he wanted to finish his tour of inspection, when the same thing

happened. He was absolutely forced to turn back. The next day, seeing that this hawk had established himself there and was making a practice of withholding his field from him, Mr. Sack took a gun along. Even this did not deter the hawk, which immediately resorted to the tactics of the past two days. This time it proved his undoing; a well directed shot put him out of commission. The farmer gave the bird to a friend, who mounted it, when it was seen by the writer.

One morning last February, Mr Hugo Paeseler, a farmer of High Falls, Labelle Co., Quebec, went into his wood-lot near his house. Not far in, he noticed that a fierce battle must have been waged there not long before, because in a space of about ten by ten feet the freshly fallen snow was plowed up and liberally sprinkled with blood and feathers. Searching around for the principals of the fight, he found about ten steps away a large adult goshawk, wings spread, frozen stiff and pretty badly used generally. About the same distance in the opposite direction from the scene of hostilities, he found a barred owl, dead, but yet warm. It had alighted on a little spruce after the battle, from where it had fallen off, as the condition of the snow on the spruce and below showed, and then had crawled in a small log that lay with its hollowness right near the owl. Although she apparently had died later than the goshawk, she was more ripped up than he. The farmer, knowing the rudiments of taxidermy, skinned and "stuffed" the goshawk—in this case that is the appropriate word—,of the owl he could only do so with the head, which he thus kept. They were later seen by the writer. The theory is that the goshawk sallying forth early in the morning in quest of prey, made a mistake and pounced upon the barred owl, which was probably then returning home from its nightly foraging. She, however, did not feel like being reduced to a breakfast for the goshawk, and so gave battle, with the result that both had no more use for breakfasts. It is not likely that the owl would attack the larger goshawk, but the goshawk, especially when hungry, does not let the size of his quarry deter him much. Last October a farmer in East Templeton, Quebec, near Ottawa, shot a beautiful adult female goshawk in the act of doing away with a large Plymouth Rock rooster. That fight in the snowy woods that morning must certainly have been a battle royal, and an interesting sight could one have witnessed it.

Ottawa, Ont., August 16th, 1907.

## LIST OF COLEOPTERA TAKEN BY PROF. JNO. MACOUN ALONG THE LINE OF THE G. T. P. RY. BETWEEN PORTAGE LA PRAIRIE, MAN., AND EDMONTON, ALTA., IN 1906.

DETERMINED BY JOHN D. EVANS WITH THE ASSISTANCE OF PROF. H. F. WICKHAM.

| No. | | SPECIMENS. |
|---|---|---|
| 116 | Carabus mæander, Fisch | 2 |
| 119 | Carabus tædatus, Fab | 8 |
| 142 | Calosoma calidum, Fab | 1 |
| 145 | Calosoma moniliatum, Lec | 5 |
| 195 | Nebria Sahlbergi, Fisch | 1 |
| 308 | Bembidium inæquale, Say | 3 |
| 630 | Amara carinata, Lec | 3 |
| 652 | Amara pallipes, Kirby | 1 |
| 666 | Amara confusa, Lec | 3 |
| 742 | Calathus gregarius, Say | 2 |
| 794 | Platynus affinis, Kirby | 1 |
| 800 | Platynus cupripennis, Say | 4 |
| 829 | Platynus sordens, Kirby | 1 |
| 883 | Lebia pumila, Dej | 1 |
| 940 | Cymindis cribricollis, Dej | 4 |
| 1094 | Harpalus herbivagus, Say | 1 |
| 1101 | Harpalus cautus, Dej | 2 |
| | Harpalus near fraternus, Lec | 1 |
| 1465 | Rhantus notatus, Fab | 1 |
| 1698 | Necrophorus marginatus, Fab | 1 |
| 1706 | Silpha lapponica, Hbst | 3 |
| 1711 | Silpha ramosa, Say | 1 |
| | Anisotoma sp | 1 |
| 2124 | Staphylinus badipes, Lec | 1 |
| 2996 | Olibrus vittatus, Lec | 1 |
| 2998 | Olibrus striatulus, Lec | 1 |
| 3051 | Hippodamia parenthesis, Say | 2 |
| 3059 | Coccinella transversoguttata, Fab | 1 |
| 3583 | Saprinus lugens, Er | 1 |
| 3734 | Pocadius helvolus, Er | 31 |
| 3739 | Meligethes mutatus, Har | 1 |
| 3893 | Byrrhus Kirbyi, Lec | 1 |
| 4287 | Agriotes limosus, Lec | 1 |
| | Melanotus sp | 1 |
| 4426 | Corymbites virens, Sch | 1 |
| 4576 | Dicerca prolongata, Lec | 1 |
| | Podabrus sp | 1 |
| 4952 | Telephorus oregonus, Lec. Var. B | 1 |

| | | |
|---|---|---|
| 5513 | Aphodius occidentalis, Horn | 2 |
| 5550 | Aphodius consentaneus, Lec | 25 |
| 5659 | Dichelonycha testacea, Kirby | 5 |
| 5674 | Serica vespertina, Gyll | 1 |
| 5681 | Serica sericea, Ill | 1 |
| 5706 | Diplotaxis tristis, Kirby | 2 |
| 6550 | Orsodachna atra, Ahr | 2 |
| 6614a | Cryptocephalus notatus, Fab | 1 |
| 6781 | Entomoscelis adonidis, Fab | 1 |
| 6807 | Chrysomela lunata, Fab | 1 |
| 6810a | Chrysomela Bigsbyana, Kirby | 1 |
| 6838 | Lina tremulæ, Fab | 4 |
| 6907 | Galerucella decora, Say | 1 |
| 6948 | Disonycha caroliniana, Fab | 7 |
| 6958 | Disonycha xanthomelæna, Dalm | 1 |
| 7320 | Eleodes tricostata, Say | 6 |
| 7697 | Scotodes americanus, Horn. (Not heretofore recorded from Canada) | 1 |
| 7846 | Mordellistena unicolor, Lec | 7 |
| 7887 | Corphyra terminalis, Say | 1 |
| 8061 | Macrobasis unicolor, Kirby | 10 |
| 8083 | Epicauta sericans, Lec | 1 |
| 8132 | Cantharis Nuttalli, Say | 1 |
| 8133 | Cantharis cyanipennis, Say | 4 |
| 8210 | Rhynchites bicolor, Fab | 8 |
| 8279 | Nocheles æqualis, Horn | 2 |
| 8357 | Trichalophus simplex, Lec | 3 |
| 8540 | Gryphidius equiseti, Fab | 2 |
| 8543 | Erycus puncticollis, Lec | 1 |

## MEETING OF COUNCIL.

A meeting of the Council of the Club was held on Tuesday, September 12th, with the following members in attendance: Messrs. A. E. Attwood, E. E. Lemieux, H. H. Pitts, T. E. Clarke, Rev. C. G. Eifrig, Miss A. L. Matthews and Miss Q. Jackson.

The following were elected ordinary members: Rev. W. A. McIlroy, Ottawa; Rev. B. Thompson, Hintonburgh; Mr. W. D. Fitz-Henry, Myrtle, Man.

It was decided to recommend to the Council for the next club year, that a programme of excursions for the season be drawn up at the first meeting of the Council and that a printed copy of the programme be mailed to each member of the Club. Fall excursions were arranged for as follows:—

September 14th, Beaver Meadow, Hull; September 21st, Queen's Park, Aylmer; September 28th, Rockliffe.

## REPORT OF THE ZOOLOGICAL BRANCH, 1906.

The Zoological Branch of the Ottawa Field Naturalists' Club have the honour to report as follows: Two meetings have been held during the past season, the first on November 9th, when the principal business was the making arrangements for the zoological exhibit at the soiree on December 4th; but the zoologists present afterwards joined in a general discussion upon various topics of interest. On March 16th, the second meeting took place, and the season's work was reviewed, but it is necessary in the report now presented to refer only to such matters as may have general interest and in some cases have an element of novelty. Both the meetings, it may be added, were held at the house of the convener of the Branch (Professor Prince).

An important feature of the season 1906 was the abnormal lowness of the water in the Ottawa River and tributary waters, affecting, indeed, the whole district. Many creeks and ponds which in previous dry seasons have retained a quantity of water were perfectly dry, and the usual stock of aquatic animals and plants seemed to have disappeared. Whatever the cause, the effect of this drought upon aquatic life in many localities near Ottawa has been serious. Certain ponds in the suburbs of the Capital which have been favourite hunting grounds for members of the Club, and have not been dried up before, or not for many years, were perfectly parched, and one member instanced some most prolific ponds along the upper Ottawa River, near Pembroke, in which the destruction of young fishes and amphibians, and of invertebrates, had been most disastrous. One pond was visited when in the last stage of drying up, and in a small area of two or three square yards, were huddled together in a seething mass, thousands of living creatures, including tadpoles of various species of frogs and toads, numerous young fishes, *Lepomis*, *Micropterus*, *Perca*, *Etheostoma*, *Lucius*, etc., and myriads of insect larvæ, Coleoptera and Neuroptera, and numerous specimens of *Argyroneta*. Several enthusiastic young naturalists, with nets and tin vessels, rescued most of these imperilled creatures and deposited them in shallow places in the main river. It will be interesting to see the effect generally of this drought upon the aquatic life in the dried-up ponds referred to.

Of mammals mention must be made of a band of wolves heard howling near Pembina Lake in the upper Lievre River district, these animals uttering their weird cries even in the day time, it is asserted. Virginia deer were reported at the Rockliffe Range in the fall, and bears and deer at Hammond. A black musk-rat, *Fiber zibethicus*, was captured near Ottawa and

added to the Fisheries' Museum collection. It is, of course, a case of melanism. Of reptiles the interesting capture of a most elegantly tinted milk snake (*Ormnellia*) is worthy of note as the specimen is a very young one, not exceeding 9 inches in length, and its coloration is quite unlike the common type, indeed it resembles a southern variety. It was captured at the Rifle Range. A number of young specimens of *Menobranchus* have been recently obtained from the city water pipes; one barely 2¼ inches long shows two bright longitudinal bands of conspicuous yellow along the head, back, and the sides of the compressed tail, over the ramose external gills occur small yellow spots, and the gills are pale red; so that the immature creature differs very markedly from the adult. A larger specimen, 5½ inches long, is covered with dark spots, and thus approaches the full grown mud-puppy in external coloration. Young *Spelerpes*, Mr. Odell mentions, is yellow on the abdomen, but with spots, and the back is dark brown in the centre with a lighter band on each side. Mr. Halkett, who furnished the details regarding Menobranchus, also called attention to the predaceous habit assumed by some gold fish in the Fisheries Museum, which ate a young gar-pike (*Lepidosteus*), placed in a lively condition in their tank. It was two inches or more long, but only half of the specimen could be found when search was made for the missing ganoid. The capture of a tarpon (*T. atlanticus*) near Halifax, N.S., was reported by Prof. Prince, who points out that the range of this fish hitherto has been stated to be the warmer Atlantic waters from Brazil to Long Island. As several other southern fishes have been noted on our northern shores in recent years, possibly some deep causes are at work which encourage this migration of southern species. Mr. Halkett stated that a series of specimens of fish had been received from the salmon weirs in St. John harbour, N.B. They included *Cyclopterus lumpus*, the lumpsucker; *Lophius piscatorius*, the angler fish; a young specimen *Cryptacanthodes maculatus*, the ghostfish; *Zoarces anguillaris*, the eel-pout; and of the picked dogfish, *Squalus acanthias*, a specimen containing eight young with large yolk sac attached; this species being viviparous. Lastly the lamprey from the old salmon-retaining pond, Carleton, N.B. was recorded, possibly a land-locked variety of *Petromyzon marinus*. Mr. E. E. Lemieux had arranged for a collection of fishes being made at Pembina Lake, and a series of cyprinoids introduced into the lake in 1905 had been secured and may afford information as to the rate of growth. A local collection of sturgeon, percoids, cyprinoids, eels, the silvery lamprey (*Ichthyomyzon concolor*) and young gar-pike

were obtained during the past season, and the shipment of a huge German carp, from the Bay of Quinte, to Ottawa, is of interest, as this ponderous specimen measured over 27 inches in length.

The Crustacea came in for much attention by the zoological members of the Club. Mr. Halkett observed a specimen of the river crayfish (*Cambarus*) which laid eggs, the eggs being attached to the swimmerets on the under side of the body. The eggs were not only large in proportion to the size of the female crayfish, but they were actually larger than the eggs of the lobster, a decapod of immensely greater size. Mr. W. S. Odell reports an abnormal abundance of certain crustaceans observed under the following circumstances: at the openings cut through the ice on the clay ponds or pits near the Rideau River, crowded masses of *Canthocampus*, *Cyclops*, and *Asellus aquaticus*, came to the surface of the water. Sunfish, perch, etc., indeed an astonishing abundance of animal life, crowded thickly at these water holes and formed a thick sheet or scum so dense that the horses refused to drink the water. The ice was about a foot in thickness and the cold was intense, yet these water animals had not been so thick for many years. They decreased most markedly on the first mild day. Mr. Odell once noticed a similar superabundance of the dark winter eggs of *Daphnia* (the water flea) which formed a sheet like a layer of soot upon the surface of a pond, yet in no previous or subsequent season were they ever seen to be so plentiful, being in some winter seasons exceedingly scarce.

Mention may also be made of specimens of the whitefish and the Atlantic salmon from Magog, Que., of a few small mud-turtles from the Thousand Islands, of a specimen of turtle from Belleville, to be determined, and the purchase of two small alligators for the Fisheries Museum. The Branch notes with interest that a Fisheries Museum report is about to be issued and will contain fuller notes for popular information than previous reports. Dr. Whiteaves' valuable Bibliography of Canadian Zoology, 1905, is a welcome addition to the scientific literature of the year. It is also worthy of note that the early issue of a second part of the Contributions to Canadian Biology published in connection with the Marine Biological Station is announced and will contain some very important zoological papers by eminent Canadian scientists.

E. E. PRINCE, A. HALKETT,
W. S. ODELL, E. E. LEMIEUX.

## SUB-EXCURSION.

On Saturday, May 25th, the 5th Sub-excursion of the Club was held at the Experimental Farm. The weather being warm and bright, with a cool breeze blowing, which made walking delightful, there was an attendance of about fifty members and friends of the Club.

The leaders present were: the President, Mr. Wilson, Dr. Sinclair, Dr. Fletcher, Mr. Kingston, Rev. Mr. Eifrig, Mr. Halkett and Mr. Gibson. On reaching the Arboretum, the different parties separated under leaders, to visit the spots of most interest to them. The beautiful lawns and beds of many colored tulips about the Farm grounds were the centre of much admiration. Dr. Fletcher, with a party, studied the different trees, shrubs and botanical plants; while Mr. Eifrig and his followers sought for birds of many species. With the exception of a few hibernating kinds there were not many insects found, owing to the lateness of the season.

At 5 o'clock the members reassembled in a grove of pines and spruces near the centre of the Arboretum, and delightful talks were given by Drs. Fletcher and Sinclair and Rev. Mr. Eifrig.

Dr. Fletcher, in his charming manner, spoke of the different kinds of pines and firs found in Canada, also the imported species used for garden decoration, showing the difference between the pines by the number of their leaves and the nature of their cones. He gave both their common and scientific names, stating how in various provinces of Canada one common name is sometimes applied to different kinds of trees. He gave a piece of useful information in the way to make a camp bed of fir boughs. By putting the flat side of the branches uppermost, and placing all the butt ends of the twigs towards the head, sloping the leaves to the feet, one can procure a comfortable, springy bed. The firs are better for this purpose than the prickly spruces.

He also spoke of the Japanese quince, which is used for decorative purposes, and which grows luxuriantly in the Niagara district; and told how the fruit, which is irregularly conical, enclosing a nut-like kernel, is used as a table dessert in Japan, but has never found favor in this country, although it sometimes fruits well here. It has a strong aroma.

Dr. Sinclair was next called upon and spoke briefly of the artificiality of education, stating that all education was more or less artificial. He pointed out that the members of the Club, by visiting the Experimental Farm, which he called a laboratory, for the study and experiments of different varieties of trees, etc., were given a chance to study the artificial side of Nature in the

planting of and experimenting with imported trees, shrubs, flowers, etc., of which the Farm, in trees alone, had over 3,000 specimens.

Rev. Mr. Eifrig told of the birds he had seen and heard. He touched briefly on the lateness of the season in keeping a great many birds away that should have been here some weeks ago. Therefore the birds were not as plentiful as he had hoped to find them. He, however, saw or heard over 35 species during the afternoon, some of which were fairly numerous.

His list consisted of 3 meadow larks, 10 red-winged blackbirds, 1 phoebe, 3 bluebirds, 10 bobolinks, several song sparrows, 6 cow-birds, 5 black-and-white warblers, 10 yellow warblers, 1 Blackburnian warbler, 1 junco, 10 goldfinches, chipping sparrows, 1 black swallow, barn swallows, 1 flicker, house wrens, 2 catbirds, 1 swamp sparrow, 1 king-bird, 2 Carolina rails, 1 Baltimore oriole, 1 purple martin, 2 blue-jays, marsh hawks, purple finches, 1 bronzed grackle, 1 American redstart, 1 white-throated nuthatch, 1 red-eyed vireo, many chimney swifts, 1 crested flycatcher, common crows. The more important and rarer species of his list were: 1 spotted sandpiper, 4 parula warblers, 1 black-throated green warbler, 1 myrtle warbler. He spoke of the bad habit of the cow-bird of laying its eggs in the nests of other birds; when the two broods hatch, the fledglings of the cow-bird being much larger are apt to smother the other young birds, therefore when found the eggs should be thrown out and destroyed.

Mr. Eifrig's address brought the interesting discussions and a most enjoyable outing to a close.

R. M. G.

# THE OTTAWA NATURALIST

VOL. XXIV. OTTAWA, OCTOBER, 1907. No. 7

## THE MARINE BIOLOGICAL STATION AND ITS WORK.

A REVIEW OF "FURTHER CONTRIBUTIONS TO CANADIAN BIOLOGY," 1902–1905. 39TH ANNUAL REPORT DEPARTMENT MARINE AND FISHERIES, OTTAWA, 1907.

The publication by the Department of Marine and Fisheries of Part II. of the Journal of the Marine Biological Station of Canada, is an event of no small scientific interest, and a brief review of its contents, and of the circumstances under which the staff of the Station carry on their work, may be acceptable to our naturalists generally.

The former report from the Station was entitled "Contributions to Canadian Biology," and the present series, of thirteen papers, bears the title "Further Contributions." It is of the usual 8vo Blue Book size, of about 130 pages, and includes ten very beautiful plates, and five half-tone illustrations in the text. Professor Prince, the Dominion Commissioner of Fisheries, prefaces the report with a short note of explanation, and refers to the success of the station in enlisting the aid of voluntary workers from practically all the Canadian Universities.

"Toronto and McGill Universities have been prominently represented," Professor Prince states. "Queen's University, Kingston, has almost every season sent some representative of its academic staff, while Dalhousie (Halifax, N.S.), Mount Allison, (Sackville, N. B.), Acadia (Wolfville, N. S.) and other universities, including some United States institutions, have sent workers." The staff has been unsalaried, and only scientific workers trained and qualified to conduct original researches have been given the free use of the Station, its library, apparatus, and other advantages. By the wise generosity of the Dominion Government it has been possible to partially meet some of the expenses of the staff, but the fishery and other laborious investigations have been carried on by voluntary scientific workers, without the stimulus or reward of an adequate honorarium. No Station of the kind in the world has been operated at such slight cost to the country, and with such substantial results.

The present publication amply bears out the claim just made. It contains twice the number of papers contained in the

former report. They cover very varied topics and many of them are of inestimable value from a practical fishery point of view, while all are valuable from the purely scientific standpoint. The papers admit of a five-fold classification; they are (a) those essentially practical in object and character; (b) faunistic; (c) embryological; (d) chemico-physiological, and (e) botanical. The authors are Professors Ramsay Wright, A. P. Knight, E. E. Prince, A. B. Macallum and James Fowler; Dr. Joseph Stafford and Dr. A. H. MacKay; Mr. G. A. Cornish and Mr. C. B. Robinson; but neither the present scientific papers nor the foregoing list of authors indicate the whole of the researches conducted at the Biological Station, nor include all the staff of brilliant investigators who have spent more or less time in its laboratories.

The primary object of the Station was to aid the fisheries of the Dominion. As the fishes in the sea, indeed all the larger forms of life, depend for sustenance upon the microscopic organisms, which render sea-water "a kind of minute broth," as the late Dr. W. B. Carpenter happily styled it, Professor Ramsay Wright appropriately heads the series with an account of the "Plankton" of the Nova Scotian waters. Professor Wright shows how minute plants, invisible to the naked eye, crowd the surface waters. These build up the protoplasm necessary as food to fishes and other marine creatures. The herring and mackerel feed almost solely on this microscopic life, collectively called the "Plankton." They are not all tiny plants, some are infusorian animals, Foraminifera, Radiolarians and the like. "No one sailing over the Atlantic," Professor Wright observes, "suspects the presence of such a rich vegetation, and indeed it can only be disclosed by filtering the water through an exceedingly fine fabric—the finest silk gauze." Seven exquisite plates indicate something of the variety and beauty of the Plankton. More beautiful artistic illustrations it would be difficult to imagine. They are heliotype reproductions of Mr. J. R. G. Murray's drawings of Professor Wright's original sketches done at the Station. No less than three species of the tadpole-like larval Ascidians belonging to the Copelata were secured near Canso. As, according to the poet,

> "The ancestor remote of man, says Darwin,
> Was the Ascidian,"

these small tailed creatures, showing the first indications of a back-bone, are of uncommon interest. A most peculiar egg, no doubt that of some Gastropod shell-fish, is figured on the same plate as the Ascidians, and "suggests in its shape," as Professor Wright points out, "a low broad-brimmed hat." There are

described many beautiful Peridinians, usually regarded as plants, also Diatoms and various Foraminifers and Infusorians, as well as pelagic crustaceans and larvæ of higher forms, all of which are elements in that floating food upon which young fishes feed in Nova Scotian waters.

The three reports by Professor Knight, of Queen's University, are in many respects the most valuable in the volume, for they treat of subjects of the highest public importance. The "Sawdust Question" is dealt with in a "further" and a "final" report, and the laborious investigations and experiments commenced by Dr. Knight in 1900 and continued season after season for four or five years, are here presented in concise and readable form. Our law-makers must in future consult these splendid reports before attempting legislation on the grave "sawdust *versus* fish" controversy. The killing of fish by dynamite has been much practised in spite of statutory prohibitions, and Dr. Knight, at the suggestion of Professor Prince, carried out with much skill and at some bodily risk, experimental researches which prove how wasteful such nefarious fishing is. Professor Knight's reports entitle him to the profound gratitude of the Canadian public.

Dr. Joseph Stafford, who continues to act as Curator of the Station, reports on the Atlantic fauna; his short list of sponges, Cœlenterates and Echinoderms, 70 species in all, is the preliminary instalment of a more complete list, which will form a desirable supplement to the splendid list published seven years ago by Dr. Whiteaves. A large collection has been made at each of the five locations where the work has been carried on. A knowledge of the animal and plant life in each locality is, from a fishery standpoint, a necessary preliminary. "The study of the environment of fish and fisheries" (the Director of the Station, Professor Prince justly observes) "is as necessary as the study of the fish themselves and their habits, and of the practical methods of exploiting fishery resources."

Dr. Stafford has established a wide reputation as an authority upon Trematodes and other parasites, and his numerous papers, published largely in Germany, are substantial contributions to science. His paper on Trematodes or parasitic sucker-worms (the tenth in the present series) is a concise account of the group and their life-history, so far as known, and he gives a list of 28 known and 10 undetermined species—a very creditable addition to American Helminthology. Dr. A. H. MacKay, Superintendent of Education for Nova Scotia, furnishes a list of the Diatoms of Canso, and he states that the 73 species which he determined do not exhaust all the material secured at the

Station. Indeed this excellent list must be regarded as a provisional one. It is a piece of careful and exact work and will be of value to all future students of these lowly plants. A similar observation may be applied to the "Seaweeds of Canso," by Mr. C. B. Robinson, formerly of Pictou Academy, and now of the New York Botanical Gardens, Bronx Park. The algæ named include 75 species.

Among the many diligent workers at the Biological Station none were more assiduous than Mr. G. A. Cornish, of Toronto University, now Science Master at Lindsay Collegiate Institute. His two papers on the Polyzoa and the Fishes of Canso might be criticised on two grounds, viz.: the lack of concise, orderly description, and the lack of drawings. Certainly the notes on fishes should have been thoroughly revised, as much of the matter is somewhat well-worn, and usually fragmentary, and might have been pruned down with advantage. As a beginning, each list has its value, and Mr. Cornish deserves credit for his patient work. Professor James Fowler, it is pleasant to note, once more appears with a very extensive list of the plants around Canso. The names of over 300 phanerogams and cryptogams are given, while the list is prefaced by some exceedingly interesting notes. Professor Fowler has been most faithful in his services to the Station, and it is said that, in spite of his years, he recently explored the wilds of Gaspé when the Station was located there (1905-1906), and it is to be hoped that his list of Gaspesian plants will be published at an early date.

Professor Prince's memoir on the eggs and young of certain members of the herring family (the shad, alewife, herring, etc.), with three remarkably beautiful plates, some of them tinted, is of biological interest, and the general conclusion reached is that these fishes are far less rapid in growth than has been usually surmised. Professor Huxley once stated that the herring matured in one year, in his opinion, though he modified his view later; but it now appears from the more thorough and exact researches of authorities like Professor Prince, that the third or fourth year may elapse before the herring reaches its mature spawning condition. It is a striking circumstance that the herring tribe differ so greatly in the nature of their eggs and spawning habits. The sea-herring's eggs are heavy, cling together firmly and are attached to the bottom of the ocean. The egg is about one-twentieth of an inch in diameter. The sprat, so like a small herring, deposits a most delicate floating egg. Each egg floats separately and cannot be touched without being crushed, it is so delicate, while it is barely one-twenty-fifth

of an inch in diameter. The shad's eggs are separate and neither cling to each other nor float at the surface of the water. They are comparatively large (one-seventh of an inch in diameter) and roll about amongst gravel, etc., in shallow streams and rivers above tidal limits. As Professor Prince's four beautiful drawings of the young alewife or gaspereau (on Plate X) are the first ever executed of these early stages, they are of great scientific value, while the detailed drawings of the scales, etc., are of extreme interest. Professor Prince also furnishes a very readable account of the profound and technical researches of Professor A. B. Macallum, one of the most distinguished scientific men whom Canada has produced. The researches of the brilliant Professor of Physiology in Toronto University are better known in England and Germany than in our own country, and London last year honoured Dr. Macallum with the coveted F. R. S. of England. Professor Macallum investigated the "Chemistry of Medusæ" for several seasons in the Biological Station and published his results in the *Journal of Physiology*, Vol. XXIV. Professor Prince, who edits the present publication, desired a less technical and more popular version of the published paper; but for various reasons, it is understood, that a simplified account could not be prepared by the author in time for the present issue. Professor Prince himself therefore wrote this very fascinating version of Dr. Macallum's paper, minus technicalities, and presented in a revised popular form. The lovely floating medusæ or jellyfish, often brilliantly coloured, are generally thought to be composed of delicate, transparent skin and water. There is certainly little solid matter in them. Professor Owen dried a jellyfish, which weighed two pounds when alive, and found that its weight was barely thirty grains, or about one-five-hundredth of the original weight. Professor Macallum establishes the complex composition of the "jellyfish juice," and the amazing physiological independence and stability of the jellyfish cells. He disproves Professor Loeb's contention that the chemical nature of the surrounding water directly affects either the chemical nature of the medusa or its living movements and functions. Professor Macallum proves that each has its own individual resisting power and a wonderful independence of outside chemical changes, while the cells, composing the medusa's body, have a surprising selective power, and accept or reject the various salts in the surrounding sea-water, as the experiments demonstrated. Nay, more, their chemical constitution appears to be that which must have characterized animals in the primal seas of our planet. May it not be that the serum, the clear part of our own blood, is the

same as the blood of the animals in the early ages of the world, and transmitted to us in the course of æonic development? Professor Macallum's results suggest this. Mammalian serum in its proportions of sodium, calcium and potassium, is not unlike the fluid contents of the jellyfish. The evolutionist can now claim that our blood, apart from the red corpuscles, has come down to us from an ancestral stock as lowly as the medusæ, and as remote in time as the Jurassic and even the primitive Palæozoic epochs! Hardly less wonderful is the conclusion that the inorganic composition of jellyfishes is not due to the sea-water environment of to-day, but "reflects the composition of sea-water . . . . of past geological periods, possibly very remote periods." Divested of technical terms and abstruse expressions, Professor Prince's account of Dr. Macallum's remarkable researches, compressed into seven pages of these "Further Contributions," furnishes reading of rare and profound interest to all scientific students.

In reviewing a publication so welcome and of such unusual interest to all scientific students, it might appear to be superfluous to call attention to errors and to faults, typographical or otherwise. Some such faults there are, and it would have been well to have avoided or corrected them before issue from the press. In Professor Wright's paper the references to the literature are in some cases detailed in the text, in other cases they are relegated to the last page of the paper. This should have been avoided. The magnification of the figures in the plates should have been given in all cases, whereas in nearly half the figures there is no clue to the size of the organisms. Many readers will wonder what size, for example, are the interesting tailed Ascidian larvæ on Plate VII. (figs. 11 and 12). An even graver complaint is justifiable regarding the description of plates in Professor Prince's paper. Thus on Plate VIII, figs. 6c and 7 are described as the pilchard (they are evidently young gaspereaux), while figs. 10 and 11, described on page 109 as gaspereaux, are pilchard, and are copied as stated on page 108 from Mr. J. T. Cunningham's well-known and not very good figures in the Journal of the Marine Biological Station of Britain. On page 57 in Dr. MacKay's very accurate paper *Liemophora* is misprinted *Liemphora*, while the only misprint apparently in the venerable Dr. Fowler's botanical list is œ for æ in Gramineæ (page 67). On page 76 *Membranipora* is there spelt *Men* not *Mem*, while on page 101 the familiar term Clupeidæ has the grotesque form Clupieidæ. Finally, on page 89 the page heading to Mr. Cornish's notes on the fishes of Canso appears as "The Marine Polyzoa of Canso, Nova Scotia."

Naturalists generally will readily overlook these slight errors, and will be glad to see so important and valuable a series of contributions to Canadian biology issue from the Station on the Atlantic coast. Much work has been done at Malpeque, P.E.I., at Gaspe, P.Q., and at Seven Islands, on the north shore of the St. Lawrence, and the issue of reports on still further contributions from the pens of the accomplished and zealous staff of the Station will be awaited with impatience.

The Director of the Station (Professor Prince), who occupied the honoured position this year of President of Section IV (Biology, etc.,) of the Royal Society, stated to one of the most brilliant audiences of leading Canadian biologists ever assembled in Ottawa, that a Pacific coast station is to be opened for marine researches immediately under Dominion Government auspices. With the station on the west coast and a new (permanent) station at St. Andrew's on the Atlantic shore, and a Great Lakes Station near Parry Sound, future "Contributions to Canadian Biology" will no doubt surpass even the present most interesting and valuable scientific publication.

C.

---

## DATES OF ARRIVALS OF BIRDS AT CAMROSE, ALTA., IN 1906 AND 1907.

By F. L. Farley

| | 1906 | | 1907 | |
|---|---|---|---|---|
| Tree Sparrow | March | 31 | March | 23 |
| Mallard | " | 31 | | |
| Canada Goose | " | 31 | March | 23 |
| Crow | April | 6 | " | 31 |
| Junco | " | 10 | April | 19 |
| Red-tail Hawk | " | 11 | | |
| Swainson Hawk | " | 11 | March | 31 |
| Killdeer | " | 13 | April | 20 |
| Robin | " | 11 | " | 19 |
| Bluebird | " | 10 | May | 26 |
| Meadow Lark | " | 14 | April | 23 |
| Song Sparrow | " | 14 | " | 14 |
| Sparrow Hawk | " | 17 | | |
| Red-winged Blackbird | " | 20 | May | 10 |
| American Snipe | " | 23 | " | 10 |
| Bronzed Grackle | " | 24 | " | 12 |

| | | | | |
|---|---|---|---|---|
| Purple Finch | " | 24 | " | 21 |
| Yellow-shafted Flicker | " | 25 | " | 16 |
| Horned Lark | " | 23 | April | 23 |
| Vesper Sparrow | " | 24 | May | 14 |
| Brewer Blackbird | May | 2 | " | 9 |
| Sapsucker | " | 5 | " | 26 |
| Wilson Thrush | " | 5 | " | 15 |
| Pewee | " | 5 | " | 21 |
| White-crowned Sparrow | " | 5 | " | 17 |
| Savanna Sparrow | " | 7 | " | 19 |
| Lincoln Sparrow | " | 7 | June | 9 |
| Field Plover | " | 10 | May | 21 |
| White-breasted Swallow | " | 10 | " | 27 |
| Franklin Gull | " | 11 | " | 12 |
| Red-breasted Nuthatch | " | 10 | | |
| Clay-colored Sparrow | " | 12 | May | 20 |
| Sprague Skylark | " | 12 | " | 21 |
| Yellow Warbler | " | 13 | " | 23 |
| White-throated Sparrow | " | 17 | " | 26 |
| House Wren | " | 17 | " | 27 |
| Catbird | " | 18 | " | 28 |
| Myrtle Warbler | " | 18 | | |
| Barn Swallow | " | 19 | | |
| Least Flycatcher | " | 20 | June | 5 |
| Wood Pewee | " | 20 | May | 28 |
| Northern Yellowthroat | " | 23 | June | 14 |
| Baltimore Oriole | " | 23 | May | 26 |
| Rose-breasted Grosbeak | " | 23 | " | 26 |
| Accentor | June | 1 | | |
| Night Hawk | " | 1 | June | 14 |
| Leconte Sparrow | May | 30 | " | 1 |
| White-rumped Shrike | | | April | 9 |
| Yellow-legs | | | May | 9 |
| Spotted Sandpiper | | | " | 11 |
| Cowbird | | | May | 11 |
| Solitary Sandpiper | | | " | 12 |
| Fox Sparrow | | | " | 21 |
| Cliff Swallow | | | " | 27 |
| Yellow-headed Blackbird | | | June | 6 |
| Redstart | | | " | 8 |
| Mourning Dove | | | " | 9 |
| Red-eyed Vireo | | | " | 11 |
| Cedarbird | | | " | 11 |
| Trail Flycatcher | | | " | 11 |
| Warbling Vireo | | | " | 12 |

The unprecedented cold and backward Spring, all over the northern part of this continent has been the cause of much discussion among weather men and the public generally, and no doubt ornithologists have noticed the effect the unusual conditions have had in the arrival of Spring birds.

Having taken notes on the arrival of Spring birds for the past fifteen years, on and between the Red Deer and Battle rivers, in 113 degrees of West Longitude as a centre, I find they are later this Spring than in any other year. It seems strange also, that the two extremes should be reached in the two years 1907 and 1906; arrivals in 1906 were earlier than in any other year since my arrival here.

---

## ERUCA SATIVA, MILL.

Mr. J. Dearness has sent from London, Ont. to the herbarium of the Geological Survey specimens of *Eruca sativa* which may become a very troublesome weed in Canada. Mr. Poland, Yarmouth township, Elgin county, has written Mr. Dearness that this weed came to him and to a neighbour of his as an impurity in alfalfa seed, that it was scattered all over the field in which the alfalfa was planted, and that when he had pulled out all he could see it made a heap as large as half a ton of hay. Later he cut the tops off plants that had been missed, and these on October 15th were again making considerable show in parts of the field.

Since the above note was in type specimens have also come to us from Mr. T. N. Willing, Chief Inspector of Weeds for the Province of Saskatchewan. The seed from which these plants grew came from Russia mixed with alfalfa seed. The home of *Eruca sativa* is along the Mediterranean. It is not indigenous in Russia and must be growing there as a weed.

J. M. M.

## NOTES ON THE GENUS VACCINIUM.

By E. Wilson, Armstrong, B. C.

The four species here named are in our collection: *V. membranaceum*, *V. ovalifolium*, *V. Canadense*, and *V. parvifolium*.

*V. membranaceum* was collected in fruit, July 16th, on the mountain side close to Revelstoke, also at Trout Lake, Poplar, Seymour River, and the Horsefly River. This species produces the finest fruit of any of the species collected. The fruit is of a purplish black when ripe and much sweeter than *V. Canadense*, so common in northern Ontario. It also averages larger in size than *V. Canadense*, but does not yield so heavily. It is, however, a very heavy producer and is much valued for household use. The plants grow and produce the best in open or thinly wooded places, at between 2,500 and 4,000 feet. I have not often seen it above 4,500 feet. It seems to prefer a drier soil than *V. ovalifolium*, and also grows less scattered, the plants generally being abundant where it grows.

*V. ovalifolium* was collected at the same places as *V. membranaceum*, excepting near the Horsefly River. It, however, grows at a much lower altitude and generally in damper and more shady places, often in quite heavy timber. It is seen in its best state on the lower benches of the river valleys of the Gold ranges. There it produces heavily, bright-blue berries, much more solid and tart than those of *V. membranaceum*, but not so large. A peculiarity of the fruit is its very heavy bloom. The berries are round while those of *V. membranaceum* have the diameter from calyx to stem much shorter, thus producing a flat berry. The fruit is also more scattered on the bushes and thus more difficult to gather. It hangs on though much longer than that of the other species, thus producing a late fall fruit. The shrub of this species grows often 3 or 4 feet high, and sometimes higher, much higher and more difuse than *V. membranaceum*. I have never seen it in thick patches, but always scattered thinly over quite large areas. We may say, then, that *V. ovalifolium* begins at a much lower altitude than *V. membranaceum*, goes up with, but drops out before the limit of the latter is reached. The flower of *V. ovalifolium* is quite a bright pink, while that of *V. membranaceum* is a yellowish green, sometimes pinkish.

*V. Canadense* was collected in two places only, one on a small burned-over area of about an acre at about 2,500 feet altitude at Revelstoke; the other locality was near the Horsefly River. The plants are much smaller than the eastern type and produce much smaller fruit. It produces, however, as heavily

if not more so, the berries being often quite crowded. This species does not seem to thrive in British Columbia as in the east, and appears to be dwarf-like in every particular.

*V. parvifolium* was collected along the Seymour River running into Seymour Arm at the northern end of Shuswap Lake. The shrub grows about the height of *V. ovalifolium*, but more erect, often producing the appearance of a small cherry tree. It grows at the lowest altitude of any of the species, being common on the shores of the lake, which is about 1,100 feet above the sea. Our trip up Seymour River was for about 20 miles, and ended at nearly 7,000 feet. *V. parvifolium* began at the lake shore and at about 10 miles up *V. ovalifolium* began, followed soon after by *V. membranaceum*. At one time for two or three miles we had the three together, but the species dropped out in the order named as we proceeded. All disappeared at 4,500 feet. The fruit was beginning to ripen at this date July 24–27, and the appearance of the three shades of color was quite interesting. *V. parvifolium* was, however, in advance of the others. Its fruit production is in about the same ratio as that of *V. ovalifolium*, perhaps less scattered on the branches.

The fruit production of the blueberry does not seem to be so certain in British Columbia as in eastern Canada, there being many off seasons, or it may be abundant in one locality and very scarce in others. The early springs of British Columbia may be one cause of this, combined with a light snowfall. When the snowfall is light the plants get an early start in the spring, and often are in bloom early in May, or even the last week in April. If a heavy frost comes at this season, as it often does, the result is a light crop of fruit. This may account for a better fruit production at over 3,000 feet, as the altitude retards the spring growth as well as being less subject to late frosts.

It can readily be seen in British Columbia that *Vaccinium* delights in a moderately damp climate, since it disappears altogether in the dry parts, except in rare situations at high altitudes.

## REPORT OF THE ENTOMOLOGICAL BRANCH, 1906.

(Read at meeting of Club on evening of March 19, 1907).

The Entomological Branch has been actively at work. Throughout the past summerseveral members collected assiduously and regular meetings have been held during the winter. Notwithstanding the somewhat unproductive nature of the season, as a whole, many interesting insects in various orders were captured. Good progress has also been made in working up the systematic lists for the locality. Large numbers of species of diptera, hemiptera, lepidoptera, odonata and arachnida have been named by specialists, and records of these will appear before long in the pages of THE OTTAWA NATURALIST. The fortnightly meetings held at the houses of the members have been most helpful in holding the members of the Branch together, and in creating and keeping up an interest in the general subject of entomology; they have also been the means of the distribution of much valuable knowledge to those who have been fortunate enough to take part.

Some of the members of the Ottawa Field-Naturalists' Club living at a distance have done valuable work in Canadian entomology, and also in helping to complete our knowledge of the insects of the Ottawa district. The Rev. G. W. Taylor, of Wellington, B.C., continues to study the North American Geometridæ; he has identified many species of these moths for our local students and has contributed some valuable papers upon them to THE OTTAWA NATURALIST. Mr. Norman Criddle, of Aweme, Manitoba, and Mr. T. N. Willing, of Regina, Sask., have collected many plants and insects and have helped not only to work up the fauna of their own districts, but have sent many interesting specimens to their fellow workers in Ottawa. Great advance has been made in our knowledge of the local microlepidoptera. This is chiefly due to the enthusiasm of Mr. C. H. Young, and to the generous help of Mr. W. D. Kearfott, of Montclair, N. J., U.S., who has identified many hundreds of specimens which have been sent to him by our collectors from various parts of Canada. Mr. Young has collected at Ottawa and has had named by Mr. Kearfott no less than 250 species, and there are still probably another hundred species mounted and ready to go forward. During the past summer Mr. Young collected and set up in admirable manner over 1,500 specimens of these exquisite little insects. Mr. W. Metcalfe continues his studies of the hemiptera, and has added many new names to the Ottawa list. Mr. J. W. Baldwin has been very successful in collecting nice series of moths at sugar. Amongst these were most of the species of *Catocala* found at Ottawa.

During the month of May, the Rev. G. W. Taylor and the Rev. Dr. Bethune, while attending the meeting of the Royal Society of Canada, had an opportunity of meeting the members of the Branch, several of whom had the great pleasure of making excursions with them. Mr. Taylor was present at the General Excursion of the Club to Gilmour's Grove at Chelsea, held on the 20th May, where he delivered an interesting address on the Geometridæ taken during the afternoon. The members also had the pleasure of meeting Mr. T. N. Willing, Zoologist to the Saskatchewan Government, at one of the autumn evening meetings of the Branch. He exhibited a large collection of north-western insects and explained his plans for building up a reference collection at Regina.

Among the more interesting insects taken at Ottawa or within the district, as limited by the Club, the following may be mentioned:—

LEPIDOPTERA:

*Charadra deridens*, Gn., June 4, (Fletcher), June 22, (Young).

*Hadena rorulenta*, Sm., June 23, (Young).

*Hadena plutonia*, Grt., Meach Lake, July 7, (Young). First record for the Ottawa district.

*Rhynchagrotis rufipectus*, Morr., August 9, (Young).

*Noctua phyllophora*, Grt., June 22, (Fletcher).

*Mamestra distincta*, Hbn., Meach Lake, May 16, (Young).

*Mamestra cristifera*, Wlk., Meach Lake, July 10, (Young).

*Mamestra assimilans*, Morr. Four mature larvæ found feeding on the Common St. John's-wort, *Hypericum perforatum*, Sept. 22, 1905, emerged, June 7, 1906, (Gibson).

*Barathra curialis*, Sm. This interesting noctuid which was mentioned in last year's report under the name of *Barathra occidentata*, Grt., was again met with in the Ottawa district in small numbers during 1906.

*Graphiphora rubrescens*, Wlk., April 23, (Young).

*Xylina fletcheri*, Sm., Meach Lake, Sept. 6, (Young).

*Papaipema harrisii*, Grt. var. An interesting form of this species was reared from larvæ boring in the base of fronds of *Pteris aquilina*; Meach Lake, August, (Young and Gibson).

*Papaipema appassionata*, Harvey. Larvæ of this very rare species were found by Mr. Young at Meach Lake, in the roots of *Sarracenia purpurea* in August. Many of the larvæ were parasitized by the small

dipterous fly, *Masicera myoidea*. This is a most beautiful moth, and one which is still rare in collections.

*Tapinostola variana*, Morr., Meach Lake, one specimen, August 17, (Young). A new record for the Ottawa district.

*Gluphisia lintneri*, Grt., var. *arimacula*, Huds., May 23, (Young).

*Cymatophora latiferrugata*, Wlk. Larva found on *Prunus pennsylvanica*, (July 1), black, with conspicuous white spots on sides. Moth emerged in August, (Fletcher).

*Therina athasiaria*, Wlk., Meach Lake, June 17 (Young). A new record for the district.

COLEOPTERA:

*Ludius abruptus*, Say., June 20, (Fletcher).

*Malachius æneus*, L., June 6, (Fletcher); July 1,( J. A. Guignard). An interesting addition to the Ottawa list.

*Prionus californicus*, Mots., Grierson's Wharf, on the Ottawa, near Fitzroy Harbour, July 30, (Metcalfe). A wanderer from the Pacific coast.

*Crioceris asparagi*, L. Larvæ found Sept. 20, buried Sept. 22, emerged at end of October; the furthest eastern record in Ontario, (Fletcher and Gibson). Not previously found at Ottawa.

ODONATA:

*Gomphus adelphus*, Selys., Hull, June 29, 1886, (Fletcher). The first Canadian record.

*Gomphus brevis*, Selys., Hull, June 29, 1886, (Fletcher); Cumberland, June 16, (Gibson).

*Basiæschna janata*, Say, May 2, 1902, (Gibson).

*Macromia illinoiensis*, Walsh, Hull, June 29, (Fletcher).

*Helocordulia uhleri*, Selys, Buckingham, May 31, (Fletcher).

*Tetragoneuria spinosa*, Selys, Hull, May 22, 1886, (Fletcher).

All of the above species of Odonata have recently been kindly determined by Dr. E. M. Walker, of Toronto.

W. H. HARRINGTON,
JAMES FLETCHER,
ARTHUR GIBSON, } Leaders.
C. H. YOUNG,
J. W. BALDWIN.

## WITH THE FIELD NATURALISTS' CLUB, ROCKLIFFE WOODS, SEPT. 28TH, 1907.

A grey day, with just enough of a suspicion of cold in the air to make the blood tingle, and give intense enjoyment to a walk in the woods, greeted the Ottawa Field Naturalists' Club at their meeting at Rockliffe, Saturday, Sept. 28th. The "Father" of the Club, Dr. James Fletcher, was there, with ever abundant store of information on nature lore; Dr. Sinclair, Vice-Principal of the Normal School, with his large family of Normal School students, with their intelligent, bright faces; Mr. Arthur Gibson, of the Experimental Farm, and Mr. Power, of the Normal School, a new addition and a most helpful one, and about sixty interested followers of Nature Study and lovers of "God's great out of doors."

The meeting place was the pavilion, and having strolled through the woods, the "round up" was held at the south end of MacKay's Lake (Hemlock Lake). Here the stores of flowers, plants, and insects were brought and commented upon, and valuable lessons learned from wood, tree and flower.

Dr. Sinclair, in a few words introduced Dr. James Fletcher as the "Father" of the Club, and remarked that Cicero's celebrated quotation might be used here, as there were so many generals to call upon. In speaking of the different trees, Dr. Fletcher called attention to the plentiful flowers on the maple, the only specimen of the beech to be seen, the ash, the locust, and others in the neighborhood. The interdependence of the animal and vegetable world was commented upon. The last spring, the cold had killed the insects which should have fertilized the trees and flowers, the birds had suffered and died for want of insects to feed upon. Dr. Fletcher spoke also of his success in the destruction of the Miller moth, by the application of intense cold, which was a pest to flour millers. He showed the wise provision of Nature for the trees and shrubs for the approaching winter, after their leaves drop in the autumn, and that of the evergreens and those having peculiarly shaped foliage which stood the strain of the winds and snow. Mr. Power on being called upon spoke on the same subject, and told in a humourous strain of the dearth of fruit at one time in Australia, which resulted from the loss of bees because there were too many mice, and too many mice because there were not enough cats, and too few cats because there were not enough old maids to care for them. Mr. Power spoke very highly of the great good the Club was doing in Nature Study and the great assistance it was to Normal School students. Mr. Arthur Gibson showed specimens of the

tussock moth which has caused much havoc to vegetation, and spoke of four different kinds of caterpillars which he had collected. These were the hedge-hog caterpillar, the checkered tussock moth (*Halisidota*), the hickory tussock moth (*Halisidota Caryae*) and the salt-marsh caterpillar. All of these are common species belonging to the family *Arctiidae*, and with the exception of the first named, which live as a caterpillar all through the winter under boards, etc., spin their cocoons during the autumn, the moths emerging the following spring. The curious caterpillars of the large skipper butterfly *Edamus Tityrus* were found in their snug tents among the leaflets of the black locust and elicited much interest from their curious markings. They have black heads with two large orange eye-like markings, crimson throats and large yellow bug-like bodies dotted and streaked with black. Several handsome spiders were also found. Mr. Clark the secretary added his quota of interest and information.

*Plants* of interest found were:—

*Linaria vulgaris*, the interesting Peloria or monstrous form which bears flowers of an entirely different form from those of the typical plant. These do not perfect seed.

*Maples.*—Sugar Maple, Striped Maple, Spiked Maple, Red Maple, Silver Maple.

*Ash.*—Red, White and Black Ash.

*Birch.*—Cherry Birch, Yellow Birch and two forms of the Canoe Paper Birch.

*Beech.*—Blue Beech, and the True Beech.

*Iron Wood.*

Purple Vervain and Lop-seed.

With a regretful turning away from the woods and lake side covered with burs and glory through paths carpeted with falling leaves "The Swan song of the leaves" gold, crimson and brown, the Club returned from a most enjoyable, if the last of the summer's excursions.

M. McK. S.

# THE OTTAWA NATURALIST

VOL. XXI. OTTAWA, NOVEMBER, 1907. No. 8

## THE GREAT LEOPARD MOTH

(ECPANTHERIA DEFLORATA, FAB.).

By Arthur Gibson.

This insect, while southern in range, has been found in the larval state in autumn or early spring in western Ontario, but Canadian specimens of the moths are very rare in collections. In the annual report of the Entomological Society of Ontario for 1903, the Rev. Prof. Bethune published an article in which he recorded the finding of a single specimen of the larva of this moth at London, Ont., on May 6th, 1903. This was sent to the writer who made the following description of it, which was included in the above article:

Length 43 mm. General appearance—a stout, black larva, with stiff, shiny, jet-black bristles. Head 4 mm. wide, subquadrate, flattened in front, only slightly bilobed at vertex; black, shiny, excepting posterior upper part of cheek near segment 2, which is pale; suture and epistoma dull whitish; mandibles slightly reddish; hairs on face mostly black, reddish at tips. Body stout, dull black with patches and streaks of velvety black on dorsum; distinctly yellowish in the incisures; lower lateral and ventral surface paler. Tubercles large, all black, excepting vi, vii and viii, which are a dark amber colour, each bearing a bunch of stiff, black, barbed bristles; from v, vi, vii and viii many of the bristles are tinged with dark red. Tubercles i, ii and iii are nearly the same size; iv elongate. Spiracles dull orange, anterior and lost to, but above tubercle iv on abdominal segments. All the feet shiny brown tipped with black.

I was very glad indeed to have the opportunity of examining this caterpillar, as I had never before seen a living specimen. At the annual meeting of the above Society, held at Guelph, in October, 1906, Mr. J. B Williams, one of the Toronto members of the Club, exhibited two living larvæ of this handsome moth,

which had been taken by him, in the latter part of September, at Niagara Glen, Ont. Both of these larvae were different in appearance to the one described above, being distinctly reddish between the segments and almost without any yellow in the incisures. One of the specimens found by Mr. Williams was feeding on violet, which I think is a new food plant for the larva.

In the *Canadian Entomologist*, June, 1882, Dr. William Saunders says: "The larva of this insect is comparatively abundant in the autumn throughout most of the northern United States and in many parts of Canada." Of late years, however, these caterpillars have not been met with in Canada in any numbers; in fact, the three larvæ mentioned in this article are the only specimens which have been found in Canada, to the writer's knowledge, during the last fifteen years. One of the specimens found by Mr. Williams was given to the writer. It is now inflated and in the Government collection at the Central Experimental Farm.

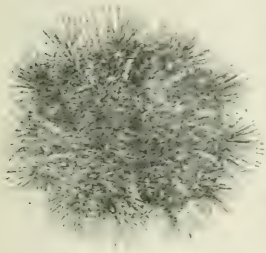
Female Moth (after Riley).

The Great Leopard Moth is the largest and one of the most beautiful of the moths of the interesting Family Arctiidæ, or Tiger Moths. The wings of both sexes are white. The rings and spots on the upper wings are black, or dark brown. Some of the rings near the base are covered with bright, steel-blue scales, and in some specimens the rings are filled in so as to look like black blots. The hind wings of the female, as shown in the figure, have more of the black markings than have those of the male. As is the case with many other arctian moths, the markings on all the wings of this species, however, are variable in number and shape. The abdomen is of a steel-blue colour above, marked, more or less down the middle and along the sides, with yellow or orange. The thorax is white, marked with spots or rings of black, and spots of steel-blue, the latter being in the centre. The head is white above and steel-blue in front. The

female is much the larger, measuring when the wings are expanded about three inches from tip to tip. A specimen in the collection of the Geological Survey Department is as large as the female shown here. The male differs from the female in being smaller and in having the wings more pointed. When expanded it measures about two and a quarter inches across. The markings, too, are less distinct.

Male Moth (after Riley).

In the Southern States this insect has sometimes been very abundant and the caterpillar has been given the name "Fever Worm" by the negroes, under the absurd impression that it is the cause of fever and ague.



Larva (after Riley).

The larva becomes full grown in autumn and curls up, passing the winter under logs or any other surface shelter it can find. According to Saunders and Riley, it feeds for the few days in spring, on grass or almost any green, low-growing plant, and then forms a loose cocoon inside of which it changes to a pupa. In this state it remains for from about two to three weeks. The specimen sent to me by the Rev. Prof. Bethune, was found in its winter quarters and had no food whatever after its capture.

On June 30th of the present year, Mr. Paul Hahn, of Toronto, took a freshly emerged specimen of the male moth, at Niagara Glen, Ont.

The food plants of the larva are Wild Sunflower (*Helianthus decapetalus*), Plantain, Willow, Poke-berry (*Phytolacca decandra*), Wild Cherry and Persimmon (Smith and Abbott), and violet, as observed by Mr. Williams.

# LIST OF COLEOPTERA COLLECTED BY MR. J. M. MACOUN IN BRITISH COLUMBIA.

Determined by John D. Evans, assisted by Professor Wickham.

The numbers in column "A" indicate the number of specimens of the several species taken at Trail in 1902.

In column "B" at Osoyoos Lake, May 30–June 9, 1905.
In column "C" at Similkameen River, June 10–20, 1905.
In column "D" at Skagit River, July 2–20, 1905.

| No. | | A | B | C | D |
|---|---|---|---|---|---|
| 18c | Cicindela montana, Lec. | | | | 1 |
| | Cicindela lauta, Casey? | | 2 | | |
| 172 | Opisthius Richardsoni, Kirby. | 2 | | | |
| 195 | Nebria Sahlbergi, Fisch. | 1 | | | |
| 630 | Amara carinata, Lec. | | 4 | 3 | |
| 670 | Amara interstitialis, Dej | | 1 | | |
| 678 | " remotestriata, Dej. | | 1 | | |
| 680 | " gibba, Lec. | | | 1. | |
| 710 | Diplochila laticollis, Lec. | | 1. | | |
| 1054 | Nothopus Zabroides, Lec. | | 1. | | |
| 1057 | Piosoma setosum, Lec. | | 1 | | |
| 1067 | Discoderus parallelus, Hald. | | 1 | | |
| 1081 | Harpalus amputatus, Say. | | 1 | 1 | |
| | Harpalus sp. | | | 1. | |
| | Cœlambus, sp. | | 2 | | |
| 1382 | Ilybius viridiæneus, Crotch | | | | 1 |
| 1614 | Berosus striatus, Say. | | | 1. | |
| 1636 | Helochares perplexus, Lec. | | 2 | | |
| 3043 | Hippodamia Lecontei, Muls. | | | 1. | |
| 3051 | Hippodamia parenthesis, Say. | | | 1. | |
| 3066 | Adalia frigida, Schn. | | 1. | | |
| 3420 | Dermestes caninus, Germ | | 1 | | |
| 3425 | Dermestes lardarius, Linn. | 1. | | | |
| 3455 | Orphilus niger, Rossi | 2 | | | |
| 4105 | Cardiophorus fenestratus, Lec. | 1 | | | |
| 4245 | Elater apicatus, Say. | | | 1. | |
| 4253 | Drasterius elegans, Fab. | | 1 | | |
| | Melanotus, sp. | | | | |
| | Corymbites near hieroglyphicus, Say. | 1 | | | |
| 4475 | Corymbites fallax, Say. | | | 1. | |
| 4484 | " cruciatus, Linn. | | | 1 | |
| | " sp. | | | 1 | |
| | Dicerca, sp. Probably new species. | 1 | | | |

| | | | | | |
|---|---|---|---|---|---|
| 4607a | Langii, Mann | | | | 1 |
| 4610 | Buprestis aurulenta, Linn. | 1 | | | |
| 4999 | Callops cribrosus, Lec. | | 1 | | |
| 5158 | Trichodes ornatus, Say. Not heretofore on record from Canada | 2 | | | |
| 5232 | Necrobia violaceus, Linn. | | 1 | | |
| 5359 | Dinoderus substriatus, Payk. | 1 | | | |
| | Aphodius, sp. | | | | 2 |
| 5517 | Aphodius fimetarius, Linn. | | | | 1 |
| 5523 | Aphodius ruricola, Melsh. | | | | 5 |
| | Aphodius, sp. | | | | 1 |
| 5726 | Diplotaxis subangulata, Lec. New to Canada | | | 1 | |
| 5939 | Trichius affinis, Gory | 1 | | | |
| 5971 | Asemum mœstum, Hald | | | | 3 |
| 6232 | Rhagium lineatum, Oliv | | | | 1 |
| 6266 | Acmæops subpilosa, Lec. | | | 1 | |
| 6338 | Leptura lætifica, Lec. | 1 | | | |
| 6341 | " chrysocoma, Kirby | 1 | | | |
| 6348 | " crassipes, Lec. | | | | 1 |
| 6353 | " vittata, Germ. | | | 1 | |
| 6363 | " aspersa, Lec. | 1 | | | |
| 6729 | Glyptoscelis albidus, Lec. Not heretofore on record from Canada | | | 1 | |
| 6769 | Graphops marcassita, Cr. | | 1 | | |
| 10386 | Scelolyperus Schwarzii, Horn | 1 | | | |
| 6905 | Galerucella nymphæ, Linn. | 2 | | | |
| 6968 | Haltica evicta, Lec. | | 1 | | |
| 7291 | Coniontis opaca, Horn. | | 1 | 2 | |
| 7325 | Eleodes humeralis, Lec. Not on record from Canada | | | 1 | |
| | Eleodes sp. | | 2 | 2 | |
| 7728 | Ditylus quadricollis, Lec. var vestitus, Lec. | | | | 1 |
| 8028 | Nemognatha dichroa, Lec. | | 1 | 2 | |
| 8077 | Epicauta puncticollis, Mann. | | | 1 | |
| | Epicauta sp. | | 1 | 1 | |
| 8092 | Macrobasis maculata, Say | | 4 | | |
| 8158 | Cantharis sphæricollis, Say | | 3 | | |

## BOTANICAL NOTES.

By James M. Macoun.

CAREX CONCINNOIDES, Mackenzie, Bull. Torr. Bot. Club, XXXII, 440.

*C. Richardsoni*, Cat. Can. Pl. II, 158 in part.

We have six sheets of this species from the Rocky Mountains, No. 64,020*, Laggan; No. 64,021, Pipestone Creek; No. 25,556, Elbow River; No. 31,762, Kananaskis; No. 7,464, Sulphur Mt., Banff (*Macoun*), and No. 22,294, Spray Valley, Banff (*N. B. Sanson*). Our British Columbia specimens are from west of Sophie Mountain (*J. M. Macoun*) and Spence's Bridge (*John Macoun*).

ERIGONUM POLYPHYLLUM, Small.

On rocky slopes, Sheep Mt., Waterton Lake, Rocky Mts., No. 12,944; South Mountain, Crow Nest Pass, No. 24,488 and mountains at Elbow River, Rocky Mts., alt. 7,000 ft., No. 24,487 (*John Macoun*). Described from specimens collected in Montana in 1897 but not before recorded from Canada.

THELYPODIUM LACINIATUM (Hook.) Endl.

Dry hillsides near Osoyoos Lake, B.C., 1905, No. 70,851 (*J. M. Macoun*). New to Canada.

CARDAMINE LYALLII, S. Wats.

Shaded banks of Whipsaw Creek, nine miles west of Princeton, B.C., 1905, No. 70,839. (*J. M. Macoun*). Our only Canadian record.

LESQUERELLA DOUGLASII, S. Wats.

Similkameen River, B.C., 1877. (*Dr. G. M. Dawson*). Osoyoos Valley, B.C., 1898. (*C. de B. Green*). Meyer's Creek, west of Midway, B.C., No. 70,852. (*W. Spreadborough*). Common around Osoyoos Lake, B.C., No. 70,853. (*J. M. Macoun*).

CLEOME INTEGRIFOLIA, T. & G.

Growing inside an old stable on the bank of the Kicking Horse River at Golden, B.C., 1906. (*R. Lambells*). Doubtless introduced from the prairie region.

RHODIOLA ROSEA, L.

*Sedum Rhodiola*, Cat. Can. Plants, vol. I, pp. 165 and 528 in part.

* The numbers given here are those under which these plants appear in the herbarium of the Geological Survey of Canada.

Our Canadian specimens of this species are all from the Atlantic coasts. Cape Chidley, Hudson Strait. Nain and Ford's Harbour, Labrador. (*Dr. R. Bell*). Port Burwell, Hudson Strait. (*Dr. L. E. Borden*). Battle Harbour, Labrador. (*Rev. A. Waghorne*). Nachvak, Labrador. (*A. P. Low*). Near mouth of Ungava River. (*W. Spreadborough*). Baddeck Falls, Cape Breton Island. (*John Macoun*). St. John Co., N.B. (*Prof. Fowler*). Magagnadavie River, N.B. (*J. Vroom*). Flowers yellowish-green.

RHODIOLA ALASKANA, Rose.

Dawson Harbour, Queen Charlotte Islands. (*Dr. G. F. Newcombe*). Leaves very pale and thin. Only Canadian record.

RHODIOLA INTEGRIFOLIA, Raf.

*Sedum Rhodiola*, Cat. Can. Plants, vol. I, p. 165 and 528 in part.

*S. frigidum*, Contr. Can. Bot. Pt. XVI.

On many of the high mountains in British Columbia. Our Rocky Mountain specimens are from Sheep Mountain, Waterton Lake; Moose Mountain, Elbow River; Cascade Mountain, Banff; Bow River Pass; Saddle Mountain, Banff. (*John Macoun*). Kananaskis. (*Dr. G. M. Dawson*). Specimens from west of the Rockies are from Old Glory Mountain near Kamloops, and Tami Hy Mountain, Chilliwack Valley. (*J. M. Macoun*). Ilgachug Mountains. (*Dr. G. M. Dawson*). Flowers purple or purplish.

TILLAEASTRUM AQUATICUM (L.) Britton.

*Centunculus minimus*, Cat. Can. Plants, vol. II, p. 340 in part.

*Tillæa simplex*, Contr. Can. Bot. Pt. V.

*T. Vaillantii*, Contr, Can. Bot. Pt. XVI in part.

Our specimens are from Mount Stewart, Prince Edward Island, No. 8,705; Beauport, near Quebec, Que., No. 68,640; Kamloops, B.C., No. 8,706. (*John Macoun*). The only specimens of *T. Vaillantii* in our herbarium are those collected on Prince Edward Island by Mr. Churchill. Prof. Macoun's specimens referred to that species in Pt. XVI of these papers proves to be *T. aquaticum*.

POTENTILLA STRIGOSA, Pursh.

Dry soil at Lake La Hâche, Cariboo Road, B.C., 1906, No. 70,326. (*E. Wilson*). Western limit in Canada.

MERTENSIA VIRGINICA, D.C.

This species has been recorded only from Point Abino,

Lake Erie. Mr. W. C. McCalla collected it in 1897 near the bottom of the ravine of "The Twenty," Lincoln Co., Ont., Mr. J. Dearness reported it in 1902 from near Wardsville, Middlesex Co., Ont., and Prof. Macoun found it to be abundant in 1907 in Kettle Creek Valley, two miles south of St. Thomas.

LEONURUS SIBIRICUS, L.

Along the Côte des Neiges Road, near Montreal, Que., September, 1906. (*Dr. Robt. Campbell*). Only Canadian station known.

NICOTIANA LONGIFLORA, Cav.

Escaped from cultivation and naturalized at Côte des Neiges near Montreal, Que. (*Dr. Robt. Campbell*). Only Canadian record.

GALINSOGA PARVIFLORA, Cav.

Several records of the finding of this species in Ontario have been recorded in these papers, but the first record for Canada was overlooked. This was made in *The Record of Science*, Vol. VI, p. 402, by Dr. Robt. Campbell, who found it in the McGill College grounds at Montreal. Dr. Campbell writes that it is now well naturalized at Montreal, its favorite habitat being vacant uncultivated spaces between the side-walks and the fronts of houses.

PETASITES SPECIOSA, (Nutt.) Piper.

*P. palmata*, Macoun, Cat. Can. Plants, vol. I, 260 in part.

All our specimens from the vicinity of the Pacific Coast are this species. They are from Port Moody, Burrard Inlet, B.C., No. 14,672; Gordon Head, Vancouver Island, No. 14,671; Comox, V.I., No. 14,676, and Sooke, V.I., No. 11,596. All collected by Prof. Macoun. We have also several Alaskan specimens.

SENECIO EREMOPHILUS, Rich.

Near streams in woods between Ashcroft and Clinton, B.C., 1906. (*E. Wilson*). Not before recorded west of the Rocky Mountains.

SONCHUS ARVENSIS, L.

Near Golden, B.C., 1906. (*R. Landells*). Our only record west of Manitoba.

## ANOTHER LOCALITY FOR ERUCA SATIVA.

To Mr. Macoun's report in the October issue of THE OTTAWA NATURALIST, of the discovery of the European plant *Eruca sativa*, in two widely separated parts of Canada, I am able to add another distinct locality, namely, Preston, Waterloo County, Ontario. The plant was found in flower about the first of August, in a small field of lucerne, which had been sown in June. It was present in considerable quantity, and had been passed over as ordinary mustard (*Brassica Sinapistrum*), until one day when I went into the field and saw it at close quarters. The habit of growth, size and superficial resemblance of leaves and flowers contribute to this similarity to mustard. A glance was sufficient, however, to show that it was something new. On endeavoring to determine the species of the plant, I found myself beaten; and all our efforts to trace it out in both American and English botanies proved futile. On October 31st I took advantage of an opportunity to show my specimens to Dr. Fletcher, Ottawa, who having just read the aforementioned report, and also having seen the plant in Europe many years ago, identified it as *Eruca*.

There are several characters by which this plant can be quite readily distinguished from wild mustard. The leaves are always more or less deeply lobed pinnately. The flowers are not quite so brightly colored, and the petals are distinctly veined with purple. When the plant has developed pods, it can be known with certainty by these. The whole upper third of the pod is a flat empty beak.

A noteworthy peculiarity about the plants which I have seen is their extreme variability, apart altogether from the influence upon them of crowding by other plants, or of any of the conditions of growth, so far as I have been able to observe. This is shown most strikingly in the leaves and pods. In some specimens the leaves are only very slightly lobed, while in others they are cut in almost to the midrib. The pods vary in shape, those on some plants being shorter and plumper than on others. Some pods, too, are nearly smooth, while those on other plants have a dense pubescence.

I have not as yet been able to learn anything definitely about the source of the seed with which this weed was introduced. It seems probable that the infestations so far known about, may have entered the country together, since the medium in each case is the same; and that there may be therefore many more to be heard from when the weed becomes known.

H. GROH.

## SKUNKS AS DESTROYERS OF POULTRY. TWO PERSONAL EXPERIENCES.

BY NORMAN CRIDDLE, TREEBANK, MAN.

It is well known that skunks have a fondness for eggs as well as poultry, but of the numerous accounts that are re ated from time to time, it is difficult to secure the authenticity necessary to make them of true scientific value.

Two instances of skunks robbing poultry houses have come under my observation recently, and as both had points of interest, they may prove worthy of relating.

The first of these occurred in October two years ago, when a young skunk dug beneath the foundation of a poultry house and killed six birds by seizing them by the back of the neck close to the head, and apparently sucking a small amount of blood from each. A most interesting feature of this attack was that the brains had been eaten from every one. The animal was trapped the next night while entering the building.

The other case which was that of egg sucking occurred here last spring.

Several hens were "sitting" upon eggs in nests about a foot from the ground. The nests consisted of boxes with only the fronts open, and then were partly closed with wooden bars some three inches apart to prevent the hens leaving the eggs excepting at special hours.

On the third of May it was noticed that nine eggs had been broken open and the contents eaten, as well as three bad eggs that were not in the nest. The hen was still sitting comfortably on the nest, and had apparently not been disturbed. There was a hole beneath the foundation of the building where the animal had entered. The next night ten more eggs went, and the following night eight more, which completed the settings of two hens. All the eggs were taken from beneath the hens and eaten in the nest without any sign of the birds having been disturbed in spite of the fact that the animal had to squeeze between the bars to get into the nest. The eggs were all opened at the large end, the top being taken off as if with a knife, without damaging the other parts of the shell. The shells were found next morning round the hens—not under them—which tends to confirm the theory that the hens had not been materially disturbed, as in that case some of the shells would have almost surely been found under them.

After the above damage had been done a thorough search

was made for the robber, which was at last discovered between a snow drift and a building in a hole formed by the thawing of the snow beneath. By means of smoke and some poking (which occasioned a very strong odour) a skunk was dislodged and shot. It proved to be a female that would have shortly produced young. It was broadly striped and measured 27 inches in length, with an additional three inches of hair on the tail. The weight was seven pounds two ounces.

## A VIVIPAROUS SNAKE.

On a small island one and a half miles above the Chat Falls, Ottawa River, Mr. E. E. Lemieux on October 1st last, killed a large milk snake (*Natrix sipedon*) in which he found forty-one young snakes averaging about 8 inches in length. It was killed at 10.30 in the morning when the sun was shining brightly, and when first seen was taking a sun bath quietly coiled up on a flat rock close to the river. It measured four feet from head to tip of tail. It was not examined until the following morning, when the young snakes were of course all found to be dead. They were coiled singly and crowded together. On the morning of October 3rd—another bright day—a live young snake of exactly the same size was found under a stone near the same spot, probably one of the same family.

As this seemed a very late date at which to find the young of this snake still unborn, Dr. Leonard Stejneger, the well known herpetologist was written to and the following is his reply in part:

"This snake brings forth living young, 40–50 at a time, during the autumn. In New York the records cover a time from August 17th to September 30th. Several other snakes of similar habits are known and the births of the young often cover a much longer period. It does not seem probable that the female carries the young over to spring. In the first place I know of no record of very early births of these snakes; second, I know of no record of females having been captured while hibernating which had fully ripe embryos; third, there seems to be no good reason why the young should not go immediately into hibernation themselves; and further, even if such an abnormally late brood should perish it would mean very little in the economy of so prolific a species."

In this connection it may be said that there is no foundation in fact for the popular belief that female snakes swallow their young when danger threatens. J. M. M.

## AN UNUSUAL VISITOR TO THE EXPERIMENTAL FARM.

On Friday morning, the 22nd of November, about 11 o'clock, a fine female Virginian deer suddenly made its appearance on the Experimental Farm. When first I saw it, it was bounding across the Farm, south of the Director's house. It ran forward across the main driveway towards the river road. Then turning it ran northward a few yards, then across the Farm north of the Director's house towards the poultry buildings. Here I lost track of it and saw it no more. I subsequently learned that it ran from there towards the northern boundary of the Farm, where there is a Forest Belt 65 feet wide in which it found temporary shelter. It made several attempts to get over the wire fence along the boundary of the Farm, and finally got its head entangled in the wires so that it was held fast. In making further attempts to extricate itself, it tried to leap over the fence and in doing so was much injured and was almost dead when discovered by two German women living nearby, who finally despatched the animal and took possession of it.

The occurrence of such large wild animals near cities and large towns is always interesting, and generally attracts a good deal of attention. During the previous day, in the afternoon, several shots were heard near the Farm, and it is not at all improbable that the deer was being hunted and had taken refuge over night in a part of the Forest Belt above referred to. When I saw it, it was very quick in its movements.

WM. SAUNDERS.

## CHUBBS' NESTS.

In the May number of the "American Naturalist" of this year, Dr. A. W. G. Wilson presents an interesting note on the characters and location of nests made by the fishes described as Chubb (*Semotilus corporalis*, Mitchill). Dr. Wilson gives excellent illustrations of the nests themselves which attain a height of nearly four feet, and are made up of stones of various sizes. The name which the Indians give the fish in question, *Macalosi*, seems to be particularly appropriate, inasmuch as the word signifies "the stone carriers." The heaps of rocks observed and described by Dr. Wilson are rather conspicuous phenomena, and could be readily mistaken for cairns or other accumulations which have a semblance to artificial construction.

H. M. A.

## MEETING OF BOTANICAL BRANCH.

The first meeting of the Botanical Branch of the Field Naturalists' Club for the season 1907–8, was held Thursday, December 5th, at the house of Rev. G. Eifrig. There were present: Messrs. Attwood, Blackadar, Campbell, Whyte, Dr. Fletcher, and the undersigned.

The chairman exhibited mounted specimens of some of our rarer plants, as *Calypso borealis*, found June 12th, 1907, plentifully near High Falls, Que.; *Gentiana crinita*, of a darker blue than most years; *Spiranthes ceruna*, very luxuriant this year at the only locality where these two species are found in the vicinity of Ottawa; *Lycopodium inundatum*, *Habenaria obtusata*, *Lobelia Dortmanna*, these three from Algonquin Park, but the last found by Dr. Fletcher also, at Meech Lake, near Ottawa. *Habenaria blephariglottis* from Mer Bleue, *Lonicera hirsuta*, etc. Of the last named it was remarked that it is very rare in the Ottawa district. It was found many years ago near South March, Carleton County. It is, however, abundant at Nepigon, north of Lake Superior, and succeeds well under cultivation. It is difficult to propagate except from seed or from offsets from the roots.

The illustrated work on farm weeds by Clark, Fletcher and Criddle, recently issued by the seed commissioner's office, was examined and discussed. A copy had been kindly furnished to each member of the section by seed commissioner Clark, and all expressed unstinted praise and admiration of the way this highly practical, useful and at the same time beautiful work had been conceived and executed. The colored plates of the weeds and seeds are a revelation in their life-likeness and exactness. It is a work of which the Department of Agriculture may well be proud. All expressed their gratitude to Mr. Clark for his kindness.

Dr. Fletcher exhibited a specimen of the large and remarkable sclerotium of the *Polyporus tuberaster*. This brought to light a bit of nice original investigation successfully conducted by the Doctor. From time to time these black, hard balls, rubberlike in appearance and heavy, had been sent to the Experimental Farm from the West, with the question: What is it? They were always found several inches under ground, mostly adhering to or in the neighborhood of some roots of willows, poplars, etc. No satisfactory answer could for a long time be given, till it occurred to Dr. Fletcher to insert a notice in some western papers, asking that these things be sent to him in a fresh state. This was done and he planted several of them

and had the pleasure of finding one day a large *Polyporus* having grown from the large sclerotium below. Photographs were taken of this by Mr. Shutt. Dr. W. G. Farlow of Cambridge, Mass., had at the same time been making the same experiments, and while pictures from here were sent to him, some of his were on the way here. He determined the species as *Polyporus tuberaster*.

G. EIFRIG.

---

## MEETING OF ENTOMOLOGICAL SOCIETY OF ONTARIO.

At the recent annual meeting of the Entomological Society of Ontario, held at Guelph, on October 31st and November 1st, the 44th since the founding of the Society, three of the local members of the Club were honoured by being elected to the executive of the Society. Dr. James Fletcher was unanimously elected President for the ensuing year, Mr. C. H. Young was appointed Director of the Society for District No. 1, and Mr. Arthur Gibson was elected as the Delegate to represent the Society at the next meeting of the Royal Society of Canada. Papers of a scientific and economic nature were presented by the above gentlemen, and also by Mr. H. H. Lyman, of Montreal, Rev. Prof. Bethune, of Guelph, and Mr. C. W. Nash, of Toronto, all members of The Ottawa Field-Naturalists' Club. In addition to papers by various contributors, two important lectures were delivered; one on "Work in Massachusetts to control the Brown-tail and Gypsy moths," by Mr. A. H. Kirkland, of Boston, who has been connected since the beginning with this work, the most extensive and successful experiment in practical entomology which has ever been attempted; and the other by Dr. E. M. Walker, of Toronto, on "Collecting and rearing Dragonflies at the Georgian Bay Biological Station in 1907." Both of these lectures were well attended and were listened to with great interest and profit by all present.

## COUNCIL MEETING.

A meeting of the Council of the Ottawa Field Naturalists' Club was held on October 8th in the Normal School with the 1st Vice-President, Mr. A. E. Attwood in the chair. Members present were: Rev. Mr. Eifrig, Messrs. H. H. Pitts, A. Gibson, E. E. Lemieux, and T. E. Clarke, Miss A. L. Matthews, Miss Q. Jackson, and Miss I. Ritchie.

Mr. J. F. Power, B.A., of the Normal School staff was elected an ordinary member of the Club.

The series of fall excursions having proved so successful, it was decided to hold a sub-excursion to Britannia on October 12th, Rev. Mr. Eifrig to be in charge.

An informal discussion on the programme of soirées for the approaching winter brought out so many good suggestions that the Club may rest assured of a repetition of the success that attended the lecture programme last season.

---

## REVIEW.

PENHALLOW, D. P., Prof. "Manual of the North American Gymnosperms." 8vo. 374 pp. Illustrated with 55 plates, &c. Ginn and Company.

In this admirable work, Prof. Penhallow, of McGill University, gives a concise account of the anatomy of the North American Gymnosperms, and a full treatment of their histological characters. The work deals with our Canadian as well as other American species, together with references to Japanese as well as Australian forms. Fossil plants referable to the Gymnosperms, which are so well-known in the extinct forests of the Coal formations of old, so far as they are being and have been studied, are included. This work is invaluable to all students of recent as well as fossil botany. There are chapters also which have a decided practical side and the economic problems involved in many instances add to the value of the work. Many interesting revelations await the reader and student who will follow the path led by Dr. Penhallow in this most valuable contribution to our knowledge of the minute structure of the Gymnosperms.

H. M. A.

## THE OTTAWA FIELD-NATURALISTS' CLUB.

### LECTURE PROGRAMME.

1907

Dec. 10.—General Exhibition of Specimens.

Address by Dr. J. F. White.

Personal Experiences in the Field during the past season:

Dr. S. B. Sinclair, "Education and Forestry." (Illustrated).

Dr. James Fletcher, "Mountain Sprites."

Dr. H. M. Ami, "A Talk on the Centenary of the Geological Society of London."

Mr. F. T. Shutt, "Rain and Snow."

Mr. A. Halkett, "Observations in the Provinces of Alberta and Saskatchewan." (Normal School).

1908

Jan. 7.—"Some Sanitary Considerations in the Construction, Heating, and Ventilation of Dwellings." P. H. Bryce, M.D.

Report of the Zoological Branch. (Carnegie Library).

Jan. 21.—"The Honey Bee and other Bees." Dr. James Fletcher.

"The Life and Work of the Honey Bee as observed from Spring to Fall," Mr. Percy H. Selwyn.

Report of the Entomological Branch. (Carnegie Library).

Feb. 4.—"The Height-of-Land Country between the St. Lawrence and Hudson Bay Waters." (Illustrated). The President, Mr. W. J. Wilson, Ph. B.

Report of the Geological Branch. (Normal School).

Feb. 18.—"Wheat, its Improvement and Uses." Dr. Charles Saunders. (Illustrated).

Report of the Ornithological Branch. (Normal School).

Mar. 3.—"The Time and Place for Nature Study in the Public Schools," Dr. John Brittain, Macdonald College.

Report of the Botanical Branch. (Normal School).

Mar. 17.—"What is the Shamrock?" Prof. John Macoun.

ANNUAL MEETING. (Carnegie Library).

All the Lectures are Free and Open to the Public. Each Meeting will begin at 8 o'clock sharp.

# THE OTTAWA NATURALIST

VOL. XXI. OTTAWA, DECEMBER, 1907 No. 9

## RAIN AND SNOW.*

By Frank T. Shutt, M.A.,

Chemist, Dominion Experimental Farms.

The speaker, at the outset, said that if the title upon the programme had led his hearers to imagine that his remarks were to be upon the weather, they were mistaken. There were weather-wise people, official and unofficial—the former constituted the staff of the Dominion Meteorological Service, the latter, the rest of the population. Weather prediction, according to the best authorities, must be based on data of temperatures, pressures, etc., taken over wide areas—and such data can only be obtained through the recognized, official channels. Again, safe predictions can only be made for a period of 48 hours ahead. Of course, some people may possess the gift of prophecy, one cannot deny it, but judging from results as regards weather, one is forced to the conclusion that the days when the spirit of the lying prophet entered into man are not passed.

Considering rain and snow from the utilitarian point of view, the lecturer said it was his desire to offer one or two thoughts on the rôle of these elements in the economy of Nature, their influence upon the industries, the agriculture and the health of the world.

The first fact to be pointed out—and it is one of fundamental importance—was that there was a constant circulation (though that word scarcely describes the process) of the moisture, the water of the world. Continuously, by day and by night, summer and winter, there ascends from sea and lake and river and moist land aqueous vapour. This evaporation is, of course, due to the heat of the sun, though direct sunlight is not necessary for the operation. Water gives off vapour at all temperatures and there is the direct conversion of snow and ice into vapour.

* This is a condensed report of an address delivered before the Ottawa Field Naturalists' Club in the Normal School, Ottawa, Dec. 10th, 1907.—Ed.

This evaporation, of course, varies constantly with the temperature, pressure, winds, etc. It has been computed that the area of the United States, on an average, evaporates from its surface 0.4 (four tenths) inches every 24 hours. This vapour ascends until its temperature is reduced to the "dew point" and thus clouds are formed. Fogs and mists are clouds on the surface of the earth, condensations to minute watery particles due to reduction in temperature. Rain and snow result from further condensation and the formation of larger particles. This ascension and descension of the world's moisture is an essential, fundamental factor in the maintenance of vegetable and animal life on the earth.

### IN THE INDUSTRIAL WORLD.

The flow of our streams and the immense volumes of water that pour over our numerous water-falls are dependant for their supply upon the annual precipitation, *i. e.* upon rain and snow. Possibly no country in the world has such wealth of power in her water courses as Canada. It has only been partially developed as yet, but from Niagara Falls alone – and it is only one of many, though the largest – there is a total power chartered for of 850,000 H.P. Of this, 299 H.P. are at present developed. These figures include the product of the works on both sides of the river. The three works generating electricity on the Canadian side can to-day furnish 154,000 H.P., and their ultimate output will be 425,000 H.P. Data might similarly be given for a score of other water-falls being utilized to-day. This water-power converted into electrical energy is employed for a thousand useful purposes. It carries us through the streets of our cities, and in many parts of Western Ontario from town to town. It lights our houses, and in the realm of manufacture has already largely replaced coal as a source of power. To tell of all its usefulness would be to give a catalogue of well nigh all our manufactures. Carbide, itself a source of light, is made through the assistance of electricity directly obtained through the power of the water-fall. Phosphorus, wood pulp, paper are similarly prepared, and so the list might be continued almost *ad infinitum*. It would indeed be difficult to estimate the value from the commercial standpoint of our precipitation and of our water-falls—they constitute one of Canada's most important natural assets.

### IN THE AGRICULTURAL WORLD.

It is, of course, to agriculture that the greatest benefit comes from our rain and snow. Vegetable life requires large

quantities of water for its maintenance. Our crop yields depend not only on the amount of plant food in the soil, on a proper texture of the soil, but also on certain climatic conditions, prominent among which, and one might say of first importance, is an adequate supply of available moisture.

We are all aware, no doubt, that the food taken from the soil by plants is absorbed by the young rootlets in the form of a very dilute solution. This dilute food solution—non-elaborated sap—passes up through the tissues of the stem or trunk and reaches the leaves where chemical changes (metabolism) takes place, elaborated sap is formed and the excess of water, after the deposition, as it might be termed, of mineral and nitrogenous matter, passes off as vapour through the stomata of the leaves. In this way enormous amounts of soil moisture are required for our crops. For every 1 lb. of dry matter stored up in the plant, at least 300 lbs. of water pass through its tissue and escape into the atmosphere. Thus, a crop of Indian corn requires, per acre, during its season of growth more than 1,000 tons of water. This must be supplied, in addition to that lost by evaporation from the surface of the soil, if a maximum crop is to be obtained. By certain methods of cultivation, soil moisture may be conserved for crop use, and thus protect our crops against seasons of drought. Indeed we now know how to keep over large amounts of soil moisture from one season for the next year's crops. This is practised in the wheat fields of our Northwest by fallowing, followed by frequent cultivation—the earth mulch so prepared checks surface evaporation. In districts of sparse precipitation, provision for the crop's need is made by irrigation. This leads us naturally to a consideration of the precipitation in various parts of Canada. In a country or district to be settled the question of the rainfall is a very important one to have some information upon, and in this connection the data that are being obtained and tabulated by the Meteorological Service of Canada are of inestimable value. The precipitation, as observed for three consecutive years at a few important points across the Dominion, is recorded in the following table. The data are taken from the published records of our Meteorological Service.

Precipitation is measured in inches. One inch of rain means 113 tons 601 lbs. of water per acre. Ten inches of snow are considered the equivalent of one inch of rain. The average rainfall at Ottawa for the past 16 years is 25.56 inches, and the average snowfall for the same period is 90.06 inches. This latter fact means that we have had, per acre, during the winter, approximately 1,000 tons of snow water.

TOTAL PRECIPITATION IN INCHES.

| | 1902 | 1903 | 1904 |
|---|---|---|---|
| Charlottetown, P.E.I.—As rain | 23.03 | 33.88 | 28.50 |
| —As snow | 6.78 | 9.00 | 9.22 |
| | 29.81 | 42.88 | 37.72 |
| Halifax, N.S.—As rain | 46.81 | 53.07 | 46.71 |
| —As snow | 5.72 | 6.05 | 10.81 |
| | 52.53 | 59.12 | 57.52 |
| St. John, N.B.—As rain | 36.08 | 37.55 | 36.84 |
| —As snow | 4.76 | 9.41 | 8.19 |
| | 40.84 | 46.96 | 45.03 |
| Montreal, Que.—As rain | 35.54 | 24.88 | 32.40 |
| —As snow | 11.22 | 11.27 | 12.32 |
| | 46.76 | 36.15 | 44.72 |
| Ottawa, Ont.—As rain | 27.46 | 24.68 | 26.40 |
| —As snow | 8.50 | 6.92 | 10.63 |
| | 35.96 | 31.60 | 37.03 |
| Toronto, Ont.—As rain | 26.11 | 25.63 | 30.04 |
| —As snow | 4.92 | 5.00 | 5.65 |
| | 31.03 | 30.63 | 35.69 |
| Winnipeg, Man.—As rain | 15.10 | 13.01 | 16.37 |
| —As snow | 5.12 | 3.91 | 6.63 |
| | 20.22 | 16.92 | 23.00 |
| Indian Head, Sask.—As rain | 10.71 | 15.55 | 11.96 |
| —As snow | 5.30 | 3.40 | 8.13 |
| | 16.01 | 18.95 | 20.09 |

TOTAL PRECIPITATION IN INCHES—*continued*

| | 1902 | 1903 | 1904 |
|---|---|---|---|
| Calgary, Alta.—As rain | 29.63 | 16.62 | 11.82 |
| —As snow | 4.54 | 3.71 | 3.06 |
| | 34.17 | 20.33 | 14.88 |
| Lethbridge, Alta.—As rain | 24.45 | 8.30 | 8.37 |
| —As snow | 3.68 | 6.52 | 3.03 |
| | 28.13 | 14.82 | 11.40 |
| Edmonton, Alta.—As rain | 16.88 | 15.26 | 12.71 |
| —As snow | 3.74 | 5.80 | 6.16 |
| | 20.62 | 21.06 | 18.87 |
| Kamloops, B.C.—As rain | 8.28 | 8.82 | 5.33 |
| —As snow | 3.72 | 1.45 | 5.45 |
| | 12.00 | 10.27 | 10.78 |
| Nicola Lake, B.C.—As rain | 8.73 | 11.51 | 4.76 |
| —As snow | 4.65 | 2.51 | 6.12 |
| | 13.38 | 14.02 | 10.88 |
| New Westminster, B.C.—As rain | 59.73 | 54.28 | 53.42 |
| —As snow | 3.51 | 3.29 | 5.67 |
| | 63.24 | 57.57 | 59.09 |
| Victoria, B.C.—As rain | 24.84 | 24.42 | 25.60 |
| —As snow | 1.61 | 1.85 | .99 |
| | 26.45 | 26.30 | 26.59 |

Another phase of the subject is the fertilizing value of rain and snow. This is a matter that has received attention during the past two years at the Experimental Farm laboratories. A sample from every rainfall and snowfall is analysed and the nitrogen compounds determined. The atmosphere contains many gases in addition to those two which make up its general composition, oxygen and nitrogen. The combustion of fuel, the oxidation of food in animals, produce gases which find a natural home in the atmosphere. From such sources, and also, no doubt, to some extent from electric discharge, the air receives gaseous nitrogen compounds. The air also contains much dust and in the neighbourhood of cities a considerable quantity of soot. The rain and the snow falling through the atmosphere dissolves these gases and washes out the dust and soot and thus bring not inconsiderable amounts of fertilizing material to the soil. The nitrogen compounds are chiefly ammonia, ammonium salts and nitrates. All these are valuable agriculturally, because they furnish available plant food. During the winter of 1906-07, 85.5 inches of snow fell and this was found to possess nitrogen compounds equivalent to 1 lb. (approximately) nitrogen per acre. Similarly, analyses of last season's rain show that it furnished 3.5 lbs. (approximately) of combined nitrogen per acre. As nitrogen suitable for plant food is worth in a fertilizer about 17 cents per lb. we find that the rain and snow together furnish, in the neighbourhood of Ottawa, about 75 cents worth of plant food per acre.

The soot and dust present in what appears to us the whitest snow is readily made evident by collecting some snow immediately after a fall and allowing it to melt in a clear glass jar—as the snow liquifies the soot will be seen clinging to the sides of the vessel and there will probably be also a deposit at the bottom of the jar.

Snow benefits the farmer and fruit grower in other ways besides fertilizing the land. Thus it lies as a blanket protecting the roots of our fruit trees against excessive cold.

### How Rain and Snow Affect the Health of the World.

The filtering of the atmosphere, the washing of the atmosphere by the rain and snow, have already been referred to; they purify and cleanse the air of both gaseous and solid impurities and further, no doubt, rid it of many microbes. The large amount of absorbent and filtering surface presented by the flakes of snow as they fall perform this useful function to a wonderful degree. In a very large measure the exhilarating character, the crispness, the clarity of our winter air is due to this action of the snow.

In this connection it was stated that from recent analyses of the rain as it fell on the Strand, in the heart of the City of London, it had been computed that no less than 3,758 tons of impurities (soot, salts of ammonia, etc.) had been washed out of the atmosphere above London (greater London comprises about 75,000 acres) in less than a week. Of course, the air of our Canadian cities is much cleaner than that of London—one reason being that we burn anthracite, whereas in London soft coal is used—but these figures are significant in indicating what rain can do in purifying the atmosphere.

The relative humidity of the air plays an important part in the maintenance of health. The humidity of the air is, of course, directly regulated or controlled by the temperature, but the source of the moisture which furnishes the air with aqueous vapour is in the water that falls as snow and rain and rises again by evaporation.

Water supplies, both large and small, from lake, river and well, must all depend on the fall of rain and snow. A season of drought means not only poor crops, but wells almost dry. In country villages, especially, does this low water mean typhoid fever. Over and over again has it been observed that an excessively dry autumn reduces the crop yield of the following year, unless the average precipitation is brought up by heavy rains the next spring—and not only this, but that sickness follows quickly in the train of drought. Stagnant water is impure water; the rain and the snow, as part of the cycle which the water of the earth performs, serves not only to give us our water supplies, but to keep them pure and wholesome.

## ARCEUTHOBIUM PUSILLUM (PECK).

*Arceuthobium pusillum* is apparently widely spread throughout Ontario and in some places is doing serious mischief. Wherever it occurs it is to be found in abundance, most of the branches of the agrasitized tree being covered with it. Specimens of *A. pusillum* on *Picea* nigra were first brought to me for identification by Mr. C. G. Fraser, one of my students. They were collected at Wilcox Lake, York County, by Messrs. S. R. Thompson and C. G. Fraser. Later further collections of staminate and pistillate plants were secured at Snelgrove by Messrs. Jas. and J. H. White, by myself at Wilcox Lake and at several points in and near Algonquin Park, and by Mr Bartlett, the Superintendent in Algonquin Park. The presence of this dwarf mistletoe is at once evident by the "witches' brooms" it occasions. It is likewise very destructive to the life of the tree.

J. H. FAULL.

## KAWARTHA MUSHROOMS.

By CEPHAS GUILLET.

In addition to the 71 species of fungi from the Kawartha Lakes recorded in the July issue of THE OTTAWA NATURALIST, the writer found eleven species in September, 1907, all at Stony Lake. These also were identified by Dr. Charles Horton Peck, and are given below. One of them, the "fly agaric," *Amanita muscaria*, L. is very poisonous. According to Underwood the decoction of this plant is used by the Russians in Siberia for producing hilarious intoxication. It owes its name to its use by country people as a fly-poison. Quite a number of these brilliant yellow and pumpkin-colored mushrooms were found on Horseshoe Island scattered about over the ground in open "second growth."

Lycoperdon gemmatum, Batsch. (A puff-ball).
Boletus spectabilis, Pk. (Edible).
Boletinus paluster, Pk.
Boletinus pictus, Pk. (Edible).
Hygrophorus conicus, (Scop.) Fr.
Lactarius vellereus, Fr.
Amanita muscaria L. Dr. Peck adds, "approaching *A. formosa* G. and R., from which it appears to differ only in having the centre of the cap orange color."
Cortinarius pulchrifolius, Pk.
Cortinarius cœrulescens, Fr.
Cortinarius mucifluus, Fr.
Cortinarius rimosus, Pk.

Four new species discovered by the present writer in the Kawartha region are described by Dr. Peck in the Bulletin of the Torrey Botanical Club, 34; 1897, ps. 97, 98, 345 and 346.

## WAXWINGS AT GALT.

Cedar waxwings are wintering around here in fairly large numbers. On December 29th, several flocks were observed feeding upon the berries of the wild holly (*Ilex verticillata*, Gray) which borders our many ponds, the fruit being very abundant this season. When taking the fruit they would always carry it to the higher trees to devour. Slate-colored juncoes were also plentiful during the latter days of December. None of our irregular winter visitants from the north have been observed so far.

Galt, December 3rd, 1907. W. HERRIOT.

# NOTES ON TWO RECENT ADDITIONS TO THE ZOOLOGICAL COLLECTIONS IN THE MUSEUM OF THE GEOLOGICAL SURVEY OF CANADA.

By J. F. WHITEAVES.

The additions are two specimens that were presented by the Rev. J. H. Keen, of Metlakatla, B.C., per Dr. James Fletcher, on the 24th of December, 1907. They are as follows —

## (1). MICROTUS MACRURUS, Merriam.

### (*The Olympic Vole*).

"Parturiunt montes, nascitur ridiculus mus."

Skin of a female of this species. The animal was captured by Mr. Keen at or near Metlakatla, on the 28th of August, 1907.

Under the auspices of the U. S. Department of Agriculture, Mr. Vernon Bailey has published a "Revision of American Voles of the Genus *Microtus*" in 1900, and Mr. David E. Lantz, "An Economic Study of Field Mice (Genus *Microtus*)" in 1907.

"Field mice, of the genus *Microtus*," writes Mr. Lantz, have "stout bodies, blunt, rounded muzzles, small eyes, and short ears often completely concealed in the fur. The tail is short and hairy; the soles of the feet are naked or clothed with short hairs, and have five or six foot pads (plantar tubercles). The incisors are broad and not grooved.

"The molar teeth, in all members of the genus, like the incisors of all rodents, grow continuously throughout the life of the animal and do not develop roots. They are prismatic in form, and the crowns show triangular dentinal spaces surrounded by lines of harder enamel. These curious enamel patterns are of great importance in the classification of the animals, as they are but slightly affected by age and wear and are remarkably constant for each species.

"About 165 living species and subspecies of *Microtus* have been recognized (1904), of which about 78 are North American."

And of these 78, it may be added, about 30 are now known to occur in Canada. In the Museum of the Survey there are about 100 skins of Canadian voles or field mice of this genus, representing at least 10 species or subspecies, and including a fine series of skins of *M. Drummondii* from Alberta and British Columbia.

The "Olympic Vole" was first described by Dr. C. Hart Merriam, under the name *Microtus macrurus*, in the Proceedings of the Academy of Natural Sciences of Philadelphia for August, 1898. The English name proposed for it by Mr. Bailey in 1900, is intended to recall to the memory the circumstance that the specimens upon which the species was originally based, were collected at Lake Cushman, in the Olympic Mountains, State of Washington.

As its specific name implies, *M. macrurus* belongs to the "Longicaudus Group" of the genus, which, according to Mr. Bailey, is characterized by the "long tail and gray color."

(2). CERATORHINA MONOCERATA (Pallas) Cassin.

(*The Rhinoceros Auklet*).

"Rara avis in terris."

One egg, which is believed to be that of a bird of this species. This egg, Dr. Fletcher writes, was brought to Mr. Keen in June, 1907, by an English sailor, who keeps a lighthouse on Lucy Island, about 7 miles west of Metlakatla. At the same time he brought an auklet, which he said he had trapped at the mouth of the hole at the end of which he found the egg. Mr. Keen says: "I can answer for the correct identification of the bird, but have, of course, only the man's word that the egg is that of a rhinoceros auklet." The egg certainly agrees very well with Dr. Coues' description of that of *Ceratorhina*, which is as follows: "Egg single, colorless or nearly so, but more or less obscurely marked, as in *Lunda* and *Fratercula*; size, 2.70 x 1.80. The egg presented by Mr. Keen measures 2.70 x 1.75. Eggs of this species would appear to be rare in collections, as they are not listed or offered for sale in any egg dealer's catalogue that the writer has seen.

The rhinoceros auklet (formerly called also the unicorn auklet or horn-billed auklet) is the only known species of the genus *Ceratorhina*. One of the most marked peculiarities of birds of this genus is the horned bill, which is thus described by Coues:—"Bill smooth, base of upper mandible with a large upright horn, and under mandible with an accessory horny piece lying between its rami; this piece and the horn deciduous, when base of mandible covered with a soft cere." Coues also says that the species inhabits "both coasts and islands of the north Pacific to Lower California and Japan;" that it is "not specially Arctic;" and that it has bred as far south as the

Farallone Islands. Lord says that it has been "found in the Gulf of Georgia," and that it "breeds on the islands around Vancouver Island." R. Brown also says that it occurs on the "coasts of Vancouver Island."

This auklet belongs to the Alcidæ or Auk family, and to the subfamily Phaleridinæ, which includes the auklets, murrelets, and black guillemots. As Coues says, the "Phaleridinæ all belong to Pacific and Polar waters, excepting some species of *Cepphus*."

Six species of auklet are recorded by Professor Macoun in his "Catalogue of Canadian Birds." In the Museum of the Survey five of these species are represented, either by mounted specimens or by eggs, and in two cases, by both. The rhinoceros auklet is represented in it only by the egg recently presented by Mr. Keen; and Cassin's auklet by a mounted specimen from Queen Charlotte Sound. The paroquet auklet is represented in it by two mounted specimens from St. Paul Island, Behring Sea; the crested auklet by two mounted specimens and one egg, from St. Paul Island; and the least auklet by three stuffed specimens and four eggs, from St. Paul Island.

## COUNCIL MEETING.

The regular monthly Council Meeting for November was attended by the following members: The President, Mr. W. J. Wilson, Messrs. A. E. Attwood, A. Halkett, A. Gibson, J. M. Macoun, H. H. Pitts, E. E. Lemieux, and T. E. Clarke; Miss A. L. Matthews, Miss Q. Jackson, and Miss I. Ritchie.

Six persons were elected as ordinary members, viz.:

W. A. Johnston, M.A., B.Sc., Geological Survey.
Chas. N. Robertson, Ottawa.
J. Létourneau, Experimental Farm.
R. F. Fleming, Normal School, Ottawa.
John Blackhall, 45 Dewson St., Toronto.
C. Camsell, B.A., Geological Survey.

## MARL SHELLS FROM COBALT.

The following species were found in a small lot of marl from Cobalt, recently received from Mr. George H. Clapp, of Pittsburg, Pa. Though not extensive, it is of interest, not only as from that locality, but for comparison with the shells from similar deposits in Michigan and elsewhere.

I am indebted to Dr. V. Sterki for the identification of the *Pisidia* and the notes accompanying them.

*Zonitoides arborea* Say. Apparently recent.

*Pyramidula cronkhitei anthonyi* Pils. Apparently recent.

*Physa heterostropha* Say.

*Planorbis bicarinatus striatus* Baker. The specimens are not only spirally lineate, but also transversely corrugated, very like the var. *corrugatus* Currier.

*Planorbis campanulatus* Say.

*Planorbis exacuous* Say.

*Planorbis parvus* Say.

*Planorbis deflectus* Say.

*Planorbis hirsutus* Gld.

*Ancylus parallelus* Hald.

*Valvata tricarinata* Say.

*Sphærium simile* Say.

*Sphærium striatinum* Lam.

*Musculium securis* Prime.

*Pisidium kirklandi* Sterki. "Like typical examples, but with finer striæ."

*Pisidium contortum* Prime.

*Pisidium rotundatum* Prime.

*Pisidium noveboracense* Prime. "Small."

*Pisidium mainense* Sterki. "Striae extremely fine and regular."

*Pisidium medianium* Sterki. "Small."

*Pisidium pauperculum* Sterki. "Small."

*Pisidium tenuissimum* Sterki. "Small".

*Pisidium vesiculare* Sterki. "A small northern variety, seen from Canada and Minnesota, very oblique and shape different from that of the types."

*Pisidium scutellatum* Sterki. "Small, juvenile."

"Not a specimen was seen that might be referred to *P. abditum*.

"It is interesting to note that most of the species are represented by small, and, in some cases, specifically northern forms especially that of *vesiculare*. *Scutellatum*, if mature, would probably show the same." BRYANT WALKER.

# NOTES ON WINTER BIRDS IN MONTCALM COUNTY, QUEBEC.

By L. McI. TERRILL.

During each December of the past two winters I have spent a fortnight camping north of Lac Tremblante, Montcalm County, Que. The weather from Dec. 8th–20th, 1906, was excessively cold, with the exception of two or three days, the thermometer dropping as low as 35° below zero, though the average was about 12° below. This was probably the cause of the appearance of large packs of wolves from the north, which in turn drove the deer closer to civilization.

This year, during the same period, we had rain or snow for several days (so mild in fact that at least one bear, one chipmunk and two specimens of a species of hibernating moth had been induced to leave their winter quarters). The wolves had not put in an appearance, and the deer were more scattered. In 1906 the ice on Lac Tremblante was a foot or more in thickness on Dec. 9th, whilst this year it had not taken on the day we left, Dec. 21st.

Of the birds observed the woodpeckers outnumbered all others, five species being noticed; namely, downy, hairy, Arctic three-toed, American three-toed, and pileated woodpeckers. I have named them in order of abundance, only a few specimens of the pileated being observed each year. I did not record the American three-toed woodpecker in 1906, but probably overlooked it.

When drilling for larvae the pileated woodpecker can be heard at a much greater distance than any of the others. Then in turn the three-toed woodpecker makes more noise than the hairy and downy. If one had a fine perception of sound he might in time almost name the different species by the sound made in drilling.

The American crossbill and pine grosbeak were noticed daily, and both were feeding principally on the seeds of coniferous trees. I heard a grosbeak singing on three or four occasions. Pine siskins were noted abundantly and less commonly the redpoll, (*A. linaria*) brown creeper, white and red-breasted nuthatch, whilst the ever present black-capped chickadee was everywhere. The difference in the abundance of the jays was notable. I have no record for the blue jay in 1906, though there may have been a few, while in 1907 they were numerous. Compare this with an abundance of Canada jays in 1906, and a scarcity in 1907 almost corresponding to that of the blue jay

in 1906. A few pairs of northern ravens were seen. Perhaps they are attracted by the deer that are shot in the district, as they feed on the entrails.

Of the Raptores the hawk owl appeared the most numerous at least in 1907, perhaps because my walks in 1907 led me over large areas of burnt mountain land, for the hawk owl seems to prefer an open space in the woods, where, from some stumps, it can see to a considerable distance. One of the hawk owls was engaged in devouring a Canada ruffed grouse. I heard the great horned owl hooting on dark days and in the evening, also saw one snowy owl in 1906, and a bald eagle in 1907.

This completes the list of birds noticed, with the exception of the Canada ruffed grouse. These birds were fairly common, but were not very noticeable in 1907 on account of the prevalent dark weather, keeping hidden beneath windfalls and in the thick of coniferous trees. In sunny weather only would they venture into the birch trees to feed on the buds.

A friend camping in the vicinity during November, 1906, gave me the following notes:—

Nov. 20, 1906—Snowy owl seen with hare.
Nov. 23, " —Black ducks still at Lac Tremblante.
Nov. 28, " —Loons seen on Lac Tremblante.

He has had occasion to be in the locality a great deal during the summer and fall and says that black ducks and loons usually remain until the lake is frozen; also that bald eagles and ravens are permanent residents.

Lac Tremblante is only a short distance from Mt. Tremblante Station, one of the highest points in the Laurentian Mountains.

---

## BOTANICAL NOTE.

*Cassia chamæcrista.* I have received from Mr. P. M. Thompson, the Science Master of the Collegiate Institute, St. Thomas, Ont., a specimen of the partridge pea which was collected by one of his students in the vicinity of St. Thomas. It grew in a meadow near to the Wabash Railroad, and Mr. Thompson suggests that this may possibly explain its occurrence at St. Thomas. However that may be the finding of the specimen of this annual plant growing in Canada is worthy of being recorded, although of course it is a common plant in sandy fields in the southern States.

JAMES FLETCHER.

## AN INTERESTING OBSERVATION ON THE FOOD HABITS OF THE YELLOW-BELLIED SAPSUCKER (*Spyropicus varius*).

While visiting Mr. R. W. Shepherd, Como, Que., on July 20th, 1907, the writer was attracted by the large number of leaves which were lying on the ground beneath a specimen of the Cottonwood (*Populus deltoidea*, Marsh) which was growing near the house.

The leaves were green and healthy looking from a distance, and as there had been no storm to blow them off we were puzzled at first to know what had caused them to fall. On enquiry we were informed that the dropping of the leaves was caused by birds. The leaves were examined and it was discovered that on every petiole, close to the blade of the leaf, there was a gall of the species known as the Poplar Stem Gall (*Pemphigus populicaulis*, Fitch). Each of these galls when perfect is the home of a colony of slate-colored plant lice, the species being known as the Poplar Stem Gall Louse. These galls had been opened and not an insect was left inside. On looking up into the tree a Yellow-Bellied Sapsucker (*Spyropicus varius*) was seen busily engaged in picking holes into the galls and evidently eating the insects which were inside. The galls grew, as described above, on the petioles of the leaves and the tearing apart of these by the bird caused the leaves to fall. Almost every leaf on the tree was affected by this gall, and we were informed by Mr. Shepherd that the almost constant falling of the leaves on the ground had made this bird a very undesirable visitor, as it was practically impossible to keep the lawn in order. This note is published in the Ottawa Naturalist as it is believed there have been few records of this kind made before.

W. T. Macoun.

Asplenium Ruta-muraria, L.—This plant was recorded in The Ottawa Naturalist, Vol. XX., p. 135 from Southampton, Ont., as new to Canada. The Rev. W. A. Burman has since shown me specimens collected by him at Banff, Rocky Mountains, in July, 1893. It must be very rare there, as few places in Canada have been so well botanized as Banff, during the past ten years, and no one else has reported it.

J. M. M.

## BOOK NOTICE.

"Farm Weeds of Canada," by George H. Clark, B.S.A., and James Fletcher, LL.D., F.R.S.C., F.L.S., with illustrations by Norman Criddle: Dominion Department of Agriculture, Branch of the Seed Commissioner.

This long looked for, beautifully illustrated bulletin, quite recently made its appearance. In his letter of transmittal to the Honourable the Minister of Agriculture, Seed Commissioner Clark draws attention to the enormous losses which are every year caused by noxious weeds, and mentions briefly some of the many means by which they become disseminated. It is pleasing to note that the three men who prepared this bulletin are all active members of the Ottawa Field-Naturalists' Club. The text of the bulletin is written by Dr. James Fletcher, our leading authority on the subject. In the introductory chapter the importance is pointed out of knowing a weed when seen, and calling it by its true name, not necessarily the botanical name, but the name it is known by and written about in agricultural publications. Under each botanical family the chief Canadian weeds are treated of with remedies, and a coloured life-sized plate is given of each. In all there are 56 plates, 51 of the most important weeds, 1 showing three grasses attacked by ergot, and 4 of the chief weed seeds found in commercial grains. On these latter 4 plates, 80 weed seeds are shown in colours, at natural size and enlarged so as to show each seed as it appears under the ordinary pocket magnifying glass used by farmers and seedsmen. The bulletin is beautifully printed and gotten up, and much credit is due to all concerned in its preparation. It will be of immense value to the farmers of Canada in acquainting them with the pernicious weeds on their farms and how to eradicate them. To the botanist too it will be a welcome addition to the literature. As a government publication it stands in a class by itself, and is undoubtedly one of the very best contributions on the subject which has yet appeared.

A. G.

# THE OTTAWA NATURALIST

VOL. XXI. OTTAWA, JANUARY, 1908 No. 10

## DATES OF DEPARTURE IN THE FALL MIGRATION OF THE MORE COMMON BIRDS OF OTTAWA.

By G. Eifrig

The appended list does not claim to be complete or quite exact. This would take several observers, who would have to have much time and opportunity at their disposal for making observations. However, the list gives an approximate idea. Some years certain birds stay longer than in others. Of many species the bulk leaves at a fairly regular time, while single skulking, belated individuals of their kind linger much longer and people accidently seeing such a one, e.g., a robin, will feel in position to impugn any list, even if its dates were accurate for the species in general. At its best the Fall migration cannot be studied so successfully as the one in Spring. Then the birds come with a greater regularity, they can be seen better on account of the bareness of the trees and fields, they are livelier, in many cases in a more flashy plumage than in Fall, when many are averse to being seen, are not given to song, and travel in smaller flocks. A few only are more noticeable in Fall than in Spring, as the blackbirds. The writer would again urge members of the O.F.N.C. to next year begin to keep a list of the birds that they know seen by them; when they saw the first and last ones, and send in such lists to him. The writer must acknowledge his indebtedness to Mrs. Brown and Miss Lees of Ottawa East, without whose co-operation this list would be much more incomplete than it is now. Several dates were also furnished by Mr. C. H. Young.

| | 1905 | 1906 | 1907 |
|---|---|---|---|
| Bluebird | Oct. 20 | Oct. 16 | Oct. 17 |
| Robin | Dec. 2 | Oct. 30 | Oct. 29 |
| Hermit Thrush | Oct. 21 | | Oct. 10 |
| Wilson's Thrush | | | Oct. 4 |
| Olive-backed Thrush | | | Oct. 2 |

| | 1905 | 1906 | 1907 |
|---|---|---|---|
| Ruby-crowned Kinglet | Oct. 23 | Oct. 16 | Oct. 14 |
| Golden-crowned Kinglet | Oct. 23 | Oct. 16 | Oct. 19 |
| White-breasted Nuthatch | Dec. 4 | Nov. 25 | Nov. 21 |
| Brown Creeper | | Dec. 4 | Nov. 23 |
| Winter Wren | Oct. 16 | Oct. 16 | Oct. 11 |
| House Wren | | | Sept. 30 |
| Catbird | | | Sept. 22 |
| Redstart | | | Sept. 6 |
| Canadian Warbler | | | Sept. 10 |
| Wilson's Warbler | | | Sept. 10 |
| Northern Yellowthroat | | | Aug. 21 |
| Mourning Warbler | | | Sept. 9 |
| Waterthrush | | | Sept. 14 |
| Oven-bird | | | Sept. 6 |
| Yellow Palm Warbler | Sept. 20 | | |
| Black-throated Green Warbler | Sept. 20 | | Oct. 10 |
| Blackburnian Warbler | | | Sept. 11 |
| Blackpoll Warbler | | | Sept. 18 |
| Bay-breasted Warbler | | | Sept. 8 |
| Chestnut-sided Warbler | | | Sept. 10 |
| Magnolia Warbler | | | Sept. 9 |
| Myrtle Warbler | Oct. 16 | Oct. 16 | Oct. 17 |
| Black-throated Blue Warbler | Sept. 6 | | Sept. 6 |
| Yellow Warbler | | | Sept. 22 |
| Black and White Warbler | Sept. 20 | | Sept. 18 |
| Blue-headed Vireo | Sept. 6 | | |
| Warbling Vireo | Sept. 11 | | Sept. 22 |
| Red-eyed Vireo | | Sept. 26 | Oct. 10 |
| Migrant Shrike | | Oct. 13 | |
| Cedarbird | | Dec. 1 | Sept. 16 |
| Bank Swallow | | | Sept. 14 |
| Barn Swallow | Aug. 29 | | Oct. 5 |
| Purple Martin | | | Aug. 25 |
| Rose-breasted Grosbeak | | | Sept. 16 |
| Fox Sparrow | Oct. 16 | | Oct. 24 |
| Swamp Sparrow | Sept. 29 | | Oct. 3 |
| Song Sparrow | Nov. 1 | Oct. 23 | Nov. 23 |
| Junco | Oct. 23 | Oct. 23 | Nov. 4 |
| Chipping Sparrow | Oct. 12 | Oct. 9 | Oct. 11 |
| Tree Sparrow | Oct. 25 | Oct. 23 | Oct. 17 |
| White-throated Sparrow | Oct. 23 | Oct. 16 | Oct. 17 |
| White-crowned Sparrow | Oct. 12 | | Oct. 3 |
| Savanna Sparrow | Sept. 20 | | Oct. 5 |
| Vesper Sparrow | Oct. 20 | Oct. 16 | Oct. 5 |
| Goldfinch | Sept. 28 | | Oct. 16 |

| | 1905 | 1906 | 1907 |
|---|---|---|---|
| Redpoll | | Dec. 13 | |
| Purple Finch | | | Oct. 2 |
| Bronzed Grackle | Oct. 10 | | Oct. 3 |
| Rusty Blackbird | Oct. 10 | | |
| Meadowlark | | Sept. 26 | Oct. 11 |
| Redwinged Blackbird | | Nov. 6 | Oct. 28 |
| Baltimore Oriole | | | Aug. 17 |
| Bobolink | | | Aug. 21 |
| Crow | Nov. 4 | | Oct. 26 |
| Prairie Horned Lark | Oct. 9 | | |
| Wood Pewee | Sept. 6 | | Sept. 11 |
| Phoebe | Oct. 10 | Sept. 26 | Oct. 2 |
| Kingbird | Aug. 31 | | Aug. 10 |
| Hummingbird | Sept. 14 | | Sept. 20 |
| Chimney Swift | | | Sept. 10 |
| Nighthawk | Aug. 21 | | Aug. 24 |
| Whip-poor-will | Oct. 5 | | Sept. 16 |
| Flicker | Sept. 28 | Sept. 26 | Oct. 1 |
| Yellow-bellied Sapsucker | Sept. 11 | | Oct. 1 |
| Downy Woodpecker | | | Oct. 17 |
| Hairy Woodpecker | Dec. 1 | | Oct. 26 |
| Kingfisher | Sept. 23 | Oct. 29 | Oct. 15 |
| Black-billed Cuckoo | | | Aug. 21 |
| Sparrow Hawk | Sept. 6 | | |
| Marsh Hawk | Nov. 7 | | Oct. 7 |
| Killdeer | Sept. 11 | Oct. 8 | Sept. 13 |
| Wilson's Snipe | Oct. 30 | Nov. 5 | Oct. 15 |
| Woodcock | Oct. 16 | Oct. 29 | |
| Great Blue Heron | Nov. 6 | Nov. 3 | Oct. 15 |
| Bittern | | Oct. 30 | Oct. 15 |
| Canada Goose | Nov. 6 | | Nov. 20 |
| Bonaparte's Gull | | | Oct. 7 |
| Herring Gull | | Nov. 3 | Dec. 7 |
| Holboell's Grebe | | Oct. 16 | Oct. 22 |
| Loon | Nov. 9 | Dec. 18 | Oct. 3 |

## LATE BIRDS AT GALT.

On December 19th, 1907, a female, or immature male, hooded merganser was shot on the Grand River within the town limits and about a half hour later a coot appeared at the same spot which was also taken, the last named being an unusually late record for this species. Golden-crowned kinglets were observed January 18th in some numbers. W. HERRIOT.
Galt, Ont., January 18th, 1908.

## NOTES ON EXPERIMENTS RELATING TO THE ORIGIN OF LIFE-FORMS.

By Mark G. McElhinney.

On January 17th, 1908, while examining several slides, made on May 6th, 1906, I made an interesting find.

Near the centre of slide No. 3 was an object, very different from the surrounding crystals. It closely resembled a small star fish, having six radiating arms. Five of these were slightly wavy, while the sixth had a decided curve to its outer third. It lacked the rigid geometrical form and outlines of the usual crystals, and the arms appeared to be rounded in section.

After it had been examined by myself, my assistant and several members of my family, I lost it on the field. After some minutes of searching it was found and then again lost. Being called away I did not look for it again for several hours and was disappointed in not rediscovering it. Some two hours of further search failed to again reveal it, and, as the slides change somewhat rapidly when removed from the incubator, I concluded that further search would be useless.

It was identical in form with a diatom described by Carpenter as *Bacteriastrum furcatum* which is frequently found in the stomachs of Ascidians, Salpae, Holothuriae and other marine animals.

My highest power being a quarter inch, I was unable to examine its structure and so am unable to say whether it was the true diatom or a crystal prototype. Its disappearance would incline one to the latter view. There not being time to stain and cover it, it may have become detached from the slide. Generally when crystals become detached, an outline remains on the slide; in this case I could find no outline.

Near it was a large crystal by which I tried to locate it. After the disappearance of the starlike form I saw an object which before had been unnoted; it resembled a large irregular amoeba, but I cannot say that it was not there before.

All of the slides are covered by an open network of fine lines which branch out irregularly, like rivers and their tributaries on a map. They appear to be a primitive form of vegetable life.

The slides were made by evaporating drops of a three per-cent. solution of sodium chloride, containing certain proportions of the elements found in animal life, and to which were added bisulphide of carbon and silicic acid.

On the morning of the 18th, I found, on the same slide, a form resembling a ciliated columnar cell. No movement was detected in either form. When my photographic apparatus is completed, I hope to be able to make positive records of the slides.

# LIST OF BIRDS SEEN ON SABLE ISLAND, N.S., FROM MARCH 28TH, 1906, TO JAN. 1ST, 1907.

BY JAMES BOUTEILER.

| NAME OF SPECIES. | DATE SEEN. | NO. SEEN. |
|---|---|---|
| American Crow | Mar. 28 | One. |
| Robin | April 5 | Seven or eight. |
| Common and Arctic Terns | " 25 | In numbers. |
| Junco | " 23 | One. |
| Semipalmated Ringed Plover | " 25 | Several. |
| Piping Plover | " 30 | Several. |
| Least Sandpiper | " 30 | Several. |
| Ruby-crowned Kinglet | May 4 | One. |
| Barn Swallow | " 10 | One. |
| Various Swallows | " 10 | About a dozen. |
| White-throated Sparrows | " 10 | Several. |
| Spotted Sandpiper | " 15 | One. |
| Yellowlegs | " 15 | Several. |
| Catbird | " 16 | Several. |
| Henslow Sparrow | " 16 | Several. |
| Vesper Sparrow | " 16 | One. |
| Black-polled Warbler | " 18 | One. |
| White-throated Sparrows | " 20 | In numbers. |
| Roseate Terns | " 20 | In numbers. |
| Red Phalarope | " 21 | In numbers. |
| Hermit Thrush | " 24 | One. |
| Magnolia Warbler | " 24 | One. |
| House Wren | " 24 | One. |
| Swamp Thrush | " 26 | One. |
| Chimney Swift | June 3 | One. |
| Gulls | " 7 | About a dozen. |
| Pine Warbler | " 17 | One. |
| Black-throated Green Warbler | " 17 | One. |
| Yellow-bellied Flycatcher | " 20 | One. |
| Long-tailed Squaws | " 26 | A pair. |
| Red-breasted Nuthatch | " 27 | One. |
| Pine Siskin | July 2 | One. |
| Yellowlegs | " 9 | One. |
| White-rumped Sandpiper | " 14 | Three. |
| Wilson Snipe | " 20 | About a dozen. |
| Curlew | " 20 | About a dozen. |
| Crossbill, American | " 21 | One. |

| NAME OF SPECIES. | DATE SEEN | NO. SEEN |
|---|---|---|
| Yellowlegs | Aug. 4 | In numbers. |
| Semipalmated Sandpiper | " 4 | A few. |
| Black-bellied Plover | " 4 | A few. |
| Sparrow Hawk | " 4 | One. |
| Pectoral Sandpiper | " 4 | One. |
| Nuthatch | " 4 | One. |
| Yellowlegs | " 4 | In numbers. |
| Black-bellied Plover | " 4 | In numbers. |
| Nuthatch | Aug. 3 | Several. |
| Curlew | Sept. 7 | In numbers. |
| Great Blue Heron | " 8 | One. |
| Bittern | " 8 | One. |
| Plover and Yellowlegs | During Sept | In numbers |
| Hawks | During Sept | Several kinds. |
| White-throated Sparrow | Sept. 23 | Several. |
| Rusty Blackbird | " 24 | Four or five. |
| Black and White Warbler | " 24 | One. |
| Black-billed Cuckoo | " 25 | One. |
| American Pipit | " 26 | Several. |
| Flycatchers | " 26 | Various kinds. |
| Terns, all left | During Sept | |
| Sanderlings | During Sept | In flocks. |
| Myrtle Warbler | Sept. 29 | In numbers. |
| Pine Warbler | " 29 | Several. |
| House Wren | " 29 | One. |
| Fox Sparrow | " 29 | One. |
| Golden-crowned Kinglet | " 29 | One. |
| Knot | Oct. 6 | One. |
| Canadian Goose | " 9 | Seven. |
| Least Bittern | " 9 | One. |
| Florida Gallinule | " 13 | One. |
| House Sparrow | " 14 | Several. |
| White-winged Crossbill | " 22 | Several. |
| Long-tailed Squaws | Nov. 1 | A few flocks. |
| Kittiwakes | " 1 | In numbers. |
| Blue-winged Teal | " 1 | One. |
| Mallard | " 1 | Six or seven. |
| Robins | " 5 | In numbers. |
| Junco | " 5 | |
| Yellow-bellied Nuthatch | " 5 | |
| Hermit Thrush | " 5 | |
| Fox Sparrows | " 13 | Two or three. |
| Scaup Ducks | " 13 | About thirty. |
| Killdeer Plover | " 13 | Two. |

| NAME OF SPECIES. | DATE SEEN. | NO. SEEN |
|---|---|---|
| Baldpate | Nov. 13 | Two. |
| Grebe | " 13 | Two. |
| Common Gallinule | " 22 | One |
| Crow | " 23 | One |
| Cormorant | Jany. 1 | |

NOTES.—The terns were seen in April only about the bars at either end of the island. When the red phalaropes arrived there were dozens of flocks of from 50 to 100 in each. The curlew were more abundant than they have been for many years. October 6th, nearly all the migrants left. The Florida gallinule taken October 13th was the first one ever taken on the island. The robins, juncos, nuthatches and hermit thrushes seen Nov. 5th were all noticed after a heavy gale.

## SOME OF THE INFLUENCES AFFECTING SEED PRODUCTION.

(MEETING OF THE BOTANICAL BRANCH).

A meeting of the Botanical Branch of the Ottawa Field Naturalists' Club was held at the house of Mr. E. R. Cameron on December 21st, 1907.

The members present were: Messrs. Fletcher, Whyte, Prof. Macoun, W. T. Macoun, E. R. Cameron, Roy Cameron, Attwood and Ami.

The chair was taken by Prof. J. Macoun who proposed a discussion on the "Influences Affecting Fruit and Seed Production." This subject had been brought to his attention by a paper prepared and read to him by his son, Mr. W. T. Macoun. After introducing the subject, Prof. Macoun asked his son to give some of the points brought up in his paper. This was done and the following extract from this paper will give some of the matter presented for discussion.

SEED PRODUCTION IN NATURE.—The principal means of reproduction in nature is by seeds, although plants frequently increase by their vegetative parts as well. In nature, individual plants do not necessarily produce their maximum crops, for in the struggle of many species for existence individual specimens may often be so crowded that they have little opportunity of producing much seed. Under cultivation many plants will produce much more seed than in nature, while others will scarcely

thrive at all, or fail utterly. Plants may be divided for the purposes of this paper into "Shade Enduring," "Light Enduring," "Shade Needing," "Light Needing."

Plants which need shade will not endure bright sunlight, hence many wild flowers growing naturally in very shady woods soon die if exposed to bright sunlight. On the contrary, plants which need light will soon die in dense shade. Examples of these are the birch and poplar, which, when they have abundant light, grow rapidly, but if shaded, will soon die. Then there are the shade enduring trees, such as the spruce, cedar, beech and hemlock, which will live for years under dense shade; and there are the light enduring species, such as some of our wild flowers, which succeed best in shady places, but will also thrive well in bright sunlight.

Plants which grow naturally in shade are not great seed producers, but to make up for this they often increase very rapidly by offsets, layers and suckers. It is interesting to note that a large proportion of the plants in woods are spring flowering species which bloom before the leaves of the trees are fully out and before there is dense shade. Most plants need abundant sunlight for great seed production as it is through sunlight and by the aid of the leaves that the nourishment necessary for the production of seed is secured. For example, take the weeds which are great seed producers. Of the many plants which have become weeds here there are very few which are natives of this country, as most of our species are woodland plants and also do not succeed well in the open, while the introduced weeds have been grown in open ground for centuries. The asters and golden rods, which are abundant seed producers, are native plants. These grow naturally in meadows or open woods.

Most of our cultivated fruits are light needing plants thriving best and producing the largest crops in full sunlight and the foregoing information has been given with a view to impressing this fact on fruit growers. Plants take food from the soil and air. From the soil, the plant food passes up through the young wood in crude sap which, on being distributed through the leaves, is changed by the action of sunlight and other agencies and becomes what is known as "elaborated" or made fit to add new tissue to the plant. This elaborated sap returns between the bark and the young wood and is distributed over the plant as required. It descends to the roots and in the case of herbaceous biennials and perennials it accumulates there and this plant food is stored up and made available for leaf or seed production the following year, as in the beet, turnip, carrot, mangold, and onion, which in

order to produce a good crop of seeds must have abundant foliage the previous year. It is our belief that when shrubs and trees have accumulated a certain amount of this elaborated sap they are induced in nature to bear fruit, but just what proportion of such sap it is necessary for each tree to have is not known. What is known, however, is that certain methods of cultivating fruits will induce fruitfulness. Most fruits require bright sunshine for the development of fruit buds, but with the sunshine there must be an abundant supply of leaves to convert the crude sap into the elaborated form.

There are many examples showing that when a certain proportion of elaborated sap is in the branches of trees, that fruit production will follow. If a branch of a tree is injured in some way so that the flow of elaborated sap downward is checked it accumulates in the branch above, and that branch having more than its proportion develops fruit buds. When the roots of a tree are severely pruned and the flow of sap downward and into them is checked the top has a larger proportion of elaborated sap than is necessary for the development of leaves merely and it develops fruit buds. A spell of dry weather at the right time in summer will probably induce the production of fruit buds as growth is checked and there is a larger proportion of elaborated sap available than there would otherwise be. When one variety of fruit is grafted on another the sap at the point of union is more or less checked in its downward course and the top retains a larger proportion of elaborated sap than it needs for its healthy development and fruit buds are produced before they would be if the tree were grown as a standard tree. Some plants and some varieties take longer to come into bearing than others, but what the vital principle is which governs this is not known, but it is evident that just as soon as there is a surplus of elaborated sap then fruitfulness is induced, hence methods of cultivation should be adopted which are known to induce fruitfulness.

PLANT FOOD AND TILLAGE.—The relation of the supply of plant food to fruit and seed production should be, and is, of the greatest interest to fruit growers. Plant food, however, is of little value unless there is moisture and heat. Some kinds of fruit require more moisture than others, and some more heat. It has been already explained that the place of origin of the original type may have much to do with the kind of soil that they will do best in.

While there is vigorous growth there is usually little seed production. Herbaceous plants, as a rule, have made most of their growth before they bloom. Woody plants also have made their strongest growth before they begin to fruit. An excess of a

nitrogenous fertilizer induces an abnormal vegetative development and this is taken advantage of by man where the vegetative part of the plant is needed for some special purpose. The large amount of nitrogenous plant food near the surface of the soil in nature is, perhaps, an important factor in inducing vigorous growth to the exclusion for a time of the fruiting tendency. In cultivating fruits it is important to have a good supply of nitrogen in the soil when the trees are young in order that the vegetative habit natural to young trees should be encouraged, as to get good crops of fruit in the future there must be a good sized tree to bear the fruit.

There was considerable discussion on the views presented by Mr. Macoun, which, in a few words were "that the production of seed depended on the proportion of elaborated sap in the tree." Dr. Jas. Fletcher did not think there was much in this theory, and took the ground that it was maturity, or in cases of trees producing seeds when they were in a weakened condition, an endeavor on the part of the tree to reproduce its kind.

Mr. R. B. Whyte thought that there was something in the evidence given and said that he had noticed it was vigorous plants which produced the largest amount of seed eventually.

Prof. Macoun was not prepared to make a definite statement as to his views, for he confessed that the points brought up had made him think there was something in Mr. Macoun's argument. He had, in the past, believed that the fruiting of the tree was a question of maturity, or an endeavor to perpetuate its kind, but was willing to believe there was something in the theory his son had advanced until it was disproved.

After this discussion some time was devoted to "Mendel's Law." Mr. Roy Cameron and Mr. A. E. Attwood taking part in what was said on this most interesting subject.

W. T. M.

# BOTANICAL NOTES.

By James M. Macoun.

PICEA ALBERTINA, S. Brown, Torreya, VII, 125.

For many years Canadian botanists who have worked in the Rocky Mountains have recognized a spruce that was referable to neither *P. Canadensis* nor *P. Mariana*, and specimens were repeatedly sent by Prof. Macoun to Dr. Sargent, to Mr. Elwes and other tree specialists with the request that they should name and describe what he was convinced was an undescribed species. All these authorities, however, persisted in referring this very characteristic tree to *P. Canadensis*, and it was left to Prof. Brown to describe it. He separates it from the white and black spruces by the following characters: It differs from *P. Canadensis* in the longer, strongly reflexed sterigmata, shorter, broader and darker colored cones with broadly rounded scales and minute sharply angled bracts, and from *P. Mariana* in the lighter colored smooth twigs with longer sterigmata, and light-blue or blue-green leaves, and cones with broader, entire scales with angular tipped bracts. This is the common spruce throughout the Canadian Rockies between the Canadian Pacific Railway and Crow Nest Pass, growing generally in low ground, and in the Bow River valley near the railway it is the most abundant tree. Near the museum at Banff.

SAGITTARIA CUNEATA, Sheldon.

Dr. J. H. Faull has collected this species at Bond Lake near Toronto for three successive years. Its occurrence, so far from its known range, is remarkable, but there seems no doubt about Dr. Faull's diagnosis being correct.

MUHLENBERGIA SCHREBERI, Gmel.

*M. diffusa*, Willd., Cat. Can. Plants, II, 194.

Southwestern Ontario between Niagara and Amherstburg.

MUHLENBERGIA TENUIFLORA (Willd.) B. S. P.

*M. Willdenowii*, Trin.: Cat. Can. Plants, II, 195.

Southern Ontario from Belleville (*Macoun*) west to Galt (*Herriot*).

MUHLENBERGIA MEXICANA, (Linn.) Trin.; Macoun, Cat. Can. Plants, II, 184, in part.

Culms diffusely branched throughout from the base; panicles numerous, oblong-ovoid or subpyramidal, rarely linear, the base usually enclosed within the subtending leaf-sheath,

Apparently rare in Canada, all our specimens having been collected between Ottawa and Galt, Ont.

MUHLENBERGIA MEXICANA, (Linn.) Trin. subsp. COMMUTATA, Scrib. Rhodora, IX, 18.

*M. Mexicana*, Macoun, Cat. Can. Plants, II, 194 in part.

Lemmas awned; awns 4-10 mm. long. Otherwise as in the species. Our specimens range from Ottawa to Pelee Point, Lake Erie.

MUHLENBERGIA FOLIOSA, Trin.

*M. Mexicana*, Macoun, Cat. Can. Plants, II, 194 in part.

*M. sylvatica*, Macoun, Cat. Can. Plants, II, 195 in part.

Culms branched above rarely to the base, branches elongated; panicles narrowly lanceolate to filiform, long-exserted, densely flowered, more or less interrupted especially towards the base. A very common species from New Brunswick west to Winnipeg.

MUHLENBERGIA FOLIOSA, Trin., var. AMBIGUA (Torr.) Scribn. Rhodora IX, 20.

Lemmas awned; awns 4-10 mm. long. Otherwise as in the species. Owen Sound, Ont., No. 26,244. (*John Macoun*). Galt, Ont. (*W. Herriot*).

MUHLENBERGIA RACEMOSA, (Michx.) B. S. P.

*M. glomerata*, Trin.; Macoun, Cat. Can. Plants, II, 194 and 391.

From Newfoundland to British Columbia.

SPOROBOLUS FILIFORMIS, (Thurb.) Scribn.

Growing at the edge of a little pool where water dripped over rocks at the S.E. end of Chilliwack Lake, B.C., alt. 3,500 ft. No. 26,430 (*J. M. Macoun*). New to Canada.

LUZULA PIPERI, (Coville). Con. U.S. Nat. Herb. XI, 185.

Growing in dense clumps on gravelly "snow-slides" at 7,000 feet altitude on the first summit west of the Skagit River, B.C. No. 70,307. (*J. M. Macoun*). New to Canada.

HABENARIA STRICTA, (Lindl.) Rydb., Bull. Torr. Bot. Club, XXIV, 189.

*H. gracilis*, Macoun, Cat. Can. Plants, II, 15.

All the localities cited for this species by Prof. Macoun are on

the B.C. coast or Vancouver Island. It has since been collected at many places in the interior. Emerald Lake, Rocky Mountain Park, No. 65,652; Revelstoke, B.C., No. 27,160 (*John Macoun*); Revelstoke, B.C., No. 69,981 (*C. H. Shaw*). Trail, Columbia River, B.C., No. 65,656; Sophie Mountain, south of Rossland, B.C., No. 65,657; several localities in the Skagit Valley, B.C., Nos. 70,241, 70,242, 70,245 and 70,246; Chilliwack Valley, B.C., Nos. 65,651, 65,654 and 65,655 (*J. M. Macoun*). Chilliwack Valley, B.C., Nos. 70,243 and 70,244 (*W. Spreadborough*).

PARNASSIA MONTANENSIS, Fernald and Rydb, N.A. Fl. XXII, 79.

*P. palustris*, Macoun, Cat. Can. Plants, I, 159 in part.

Easily separated from *P. palustris*, with which it was formerly included, by its shorter petals and conspicuous hypanthium. *P. palustris* has petals nearly twice as long as the sepals, in *P. montanensis* they barely exceed the sepals; the hypanthium is inconspicuous in the former and fully half as long as the sepals in the latter. *P. palustris* has usually 9-15 staminodia, *P. montanensis* 7-9. Our specimens are all from the Rocky Mountains and were collected at Laggan (No. 65,294), Cascade (No. 8,580), Wapta Lake (No. 65,295), Crow Nest Pass (No. 20,170) and Moose Mountain, Elbow River (No. 20,171). The Moose Mountain specimens were collected at an altitude of 6,500 feet.

RHUS OCCIDENTALIS, (Torr.) Blankinship, Mon. Agr. Coll. Sci. Stud., I, 86.

*R. glabra* var. *occidentalis*, Torr.: Macoun, Cat. Can. Plants, II, 505.

*R. glabra*, J. M. Macoun, Can. Rec. Sci. 1895, p. 11.

Though perhaps to be considered only a variety of *R. glabra*, *R. occidentalis* is distinguished from it by its longer, usually less spreading leaves, usually larger number of leaflets, shorter calyx and linear-oblong anthers. All our specimens are from west of the Selkirk Mountains. Deer Park, Columbia River, B.C., No. 4,471; Spence's Bridge, B.C., No. 4,473 (*John Macoun*). West of Cascade, B.C., No. 63,749; Pend d'Oreille River, B.C., No. 63,748 (*J. M. Macoun*). Kamloops, B.C., No. 70,323 (*E. Wilson*). Kamloops, B.C., No. 4,472 (*Fowler*). Apparently not abundant anywhere in British Columbia.

SONCHUS ARVENSIS, L.

Recorded in THE OTTAWA NATURALIST, XXI, 150, from Golden, B.C., as only western station. Mr. E. Armstrong reports that he has seen it at Armstrong, B.C. for at least three years.

## REPORT OF THE ZOOLOGICAL BRANCH, 1907.

*To the Council of the Ottawa Field Naturalists' Club*:—

In presenting the Report of this Branch of the Club's work for 1907 your leaders have to announce that the interest manifest in the study of zoology, as evidenced at the Club's excursions and in the contributions published in THE OTTAWA NATURALIST, shews no signs of diminution. In the first place the members of the Branch feel bound to record their pleasure at the erection of a splendid new zoological station by the Dominion Government at St. Andrew's, N.B., and the publication in connection therewith of a scientific report which includes a number of valuable papers on Marine Biology, etc., by eminent Canadian Zoologists. A new station of a similar character is now being completed at Departure Bay on the British Columbia coast in the vicinity of one of the richest marine zoological grounds in the Pacific waters—perhaps one of the richest in the world. Prominence was given to these marine researches at the May meeting of the Royal Society, when Professor Prince, one of our leaders, gave an address on Canadian Marine Biology, and zoological subjects were dealt with in a number of able papers. The subject of abnormalities in various animals was discussed at the same meeting, and in connection therewith it may be stated that Professor Prince has secured a remarkable specimen of a small sturgeon in which the long and powerful tail is absent, and in the absence of a true caudal member the anal fin has grown round the blunt terminal stump and acts vicariously as a tail.

The same gentleman obtained a specimen of *Helix* which had evidently taken up a permanent position in a niche in the smooth bark of a wild cherry tree. That the snail moved a little was plain from a small patch of dried glistening mucus below the niche: but as the smooth cuticle of the tree had apparently grown over the shell of the living animal, it appeared as a small protuberance. The patch of mucus alone revealed the fact that the small rounded prominence like a button was the shell of a living snail. If the marine crabs like *Inachus* are protected by overgrowths of sea-weeds on their backs, this land *Helix* in the case mentioned was as effectually protected. Professor Sydney Hickson says: "If the plants be artificially scraped off the crab will go in search of fresh ones . . . . and then deliberately decorate the carapace with them as before. There are some mollusks that artificially decorate themselves with little shells and other objects in such manner as to completely hide their general form. . . . In both these cases it is clear that the reason of the phenomena described is that of affording a covering

or mantle which hides or obscures the real form and character of the living animals." The specimen of *Helix* is in many ways even more remarkable if the covering of its shell be really an overgrowth of the outer bark of the tree upon which it was found resting—the tree being one on the banks of the Gatineau near Wakefield.

Mr. Andrew Halkett spent the Summer collecting and observing in the two new provinces of Saskatchewan and Alberta, and devoted his attention especially to the fishes, numerous specimens of which were collected, and the following list of determined species from the chain of lakes in the Qu'Appelle Valley, Saskatchewan, and from Beaver, Hastings, and Cooking lakes, Alberta, are here given as follows:—

Buffalo-fish (*Ictiobus bubalus*).
White Sucker (*Catostomus commersonii*).
Red Horse (*Moxostoma aureolum*).
Spawn-eater (*Notropis hudsonius*).
White-fish (*Coregonus clupeiformis*).
Tullibee (*Argyrosomus tullibee*).
Common Pike (*Lucius lucius*).
Brook Stickleback (*Eucalia inconstans*).
Nine-spined Stickleback (*Pygosteus pungitius*).
Sand Roller (*Percopsis guttatus*).
Pike-Perch, or Doré (*Stizostedion vitreum*).
Yellow Perch (*Perca flavescens*).
Johnny Darter (*Boleosoma nigrum*).
Burbot, or Ling (*Lota maculosa*).

Besides these certain small cyprinoids and percoids, and one or two larger fishes await determination.

Besides fishes, numerous specimens belonging to other classes of the animal kingdom were collected or observed. Some batrachians are plentiful in the two provinces, and specimens of frogs (*Rana*), toads (*Bufo*) and salamanders were collected. Both provinces appear to be poor in reptiles; no turtles were seen, but rattle-snakes (*Crotalus*) are known to inhabit certain localities in Alberta. A few specimens of a garter-snake (*Eutainia*), with a bright orange dorsal band were obtained in the Qu'Appelle Valley.

The valley of the Qu'Appelle is a regular paradise of birds, and so is Beaver Lake in Alberta, but as birds are the theme of the ornithological branch, they are not referred to further here; and in the same way, it may be said, that some insects are being submitted to Dr. Fletcher, and no doubt the entomological branch will bring to light anything about them which may happen to be worthy of mention.

The following observations regarding mammals may be of interest. Rodents, especially the little gophers, were very plentiful all over the prairies, and a few specimens of different kinds of rodents obtained. A coyote, or prairie wolf, was seen walking over a field, some 50 yards away, in the Qu'Appelle Valley; and having an opportunity Mr. Halkett paid a visit to the park in Alberta where the recently acquired herd of buffalo have been introduced. He saw about 30 of the bulls herding by themselves, but the park was too extensive to devote the time to go over the whole of it. They were massive animals, but whether owing to their transportation, or because the environment did not suit them, the most of them appeared to be in poor condition. The tracks of the escaped bull, of which so much was mentioned in the newspapers, were also seen along the shores of Beaver Lake. A shrew was found in the village of Chipman, Alberta, and three bats were obtained in the Qu'Appelle Valley.

Whilst horses and cattle appear to be in the finest condition in the valley of the Qu'Appelle, Mr. Halkett was struck with the entire absence of sheep on the ranches. On enquiring for the reason of this, he was told that it was impossible to keep them because they eat the leaves and plumose styles of a plant which the people call the prairie crocus (*Pulsatilla hirsutissima*) which are said to form masses in the stomachs of the sheep and cause their death. Cattle, on the other hand, are said to eat this plant with impunity.

An unusually handsome toad (*Bufo americana*) was obtained by Mr. E. E. Lemieux at Victoria Park, Aylmer, P.Q., and the same gentleman secured a specimen of the milk-snake (*Natrix sipedon*) in the vicinity of Chats Falls, containing over 40 perfect young, each about 6 inches long. The date was October 1st, and the capture is remarkable, not only as illustrating the viviparous character of this species, but extending its breeding season to a much later date than before recorded. Fuller notes on this capture will appear immediately in the 'Ottawa Naturalist.'

Several specimens of the lake sturgeon (*Acipenser rubicundus*) from Lake Deschene and the Ottawa River, near the Rifle Range, Ottawa, have been mounted and placed in the collection in the Fisheries Museum; but the most remarkable local find of the season, perhaps, is a specimen of the soft-shelled turtle (*Trionyx spinifer*) from l'Ange Gardien, Province of Quebec. This turtle belongs to the Super-family Trionychoidea, whereas the most of the turtles of Canada belong to the Super-family Cryptodira, and it is surely a rarity.

Two special reports entitled: 'The Local Movements of Fishes' and 'The Unutilized Fishery Products of Canada,' by Prof. Prince, Commissioner of Fisheries, have just been published in the 40th Annual Report of the Department of Marine and Fisheries, and a report of the Canadian Fisheries Museum by Mr. Halkett, treating mostly of the vertebrate portion, and especially of the fishes in the collection form Appendix 14 of the same official report.

EDWARD E. PRINCE,
ANDREW HALKETT,
W. S. ODELL,
E. E. LEMIEUX.

---

## MEETING OF ENTOMOLOGICAL BRANCH.

Meeting held at the residence of Mr. W. Simpson, 16th Jan., 1908. Present: Messrs. Fletcher, Young, Baldwin, Metcalfe, Wilson, Letourneau, Gibson and Simpson.

Mr Young exhibited a beautifully prepared case showing the life-history of the Silver-spotted Hesperid, *Eudamus tityrus*. The food plant of this species, the Common Locust, specially dried and very life-like, was shown in the centre of the case with several of the larvae working in their characteristic manner, with the body hidden inside a case made from several of the leaflets spun together around it. While examining the case a discussion arose as to what effect intense cold and freezing have on insects, and several instances were given by those present of insects having been found embedded in ice and which had afterwards revived. Reference was also made to a paper in the 22nd annual report of the Entomological Society of Ontario, 1891, by Mr. H. H. Lyman, entitled "Can Insects Survive Freezing?"

Dr. Fletcher showed specimens of a fine collection of Tenebrionidae and a pair of *Dynastes tityus*, which had been sent to him by Prof. H. F. Wickham, of Iowa City, the well known coleopterist and an Honorary Member of our Club. He also showed an ant lion from Kaslo, British Columbia, sent by Mr. J. W. Cockle and gave a short account of the larval habits of this insect. From the same place and collector he also exhibited a handsome pair of the large and rare water fly *Chauliodes californicus*, which, in general appearance, resembles the well known Hellgrammite Fly, but has an entirely different head. The specimen had been named by Prof. J. G. Needham, of

Cornell University. Specimens of *Nisoniades icelus* and of *N. brizo* were shown and the differences between the two species pointed out. It is sometimes difficult to decide to which a certain specimen may belong, but there is no doubt if the male can be secured, because of the presence on the hind tibiæ of the male of *icelus* of a long tuft of silky hairs which does not occur in *brizo*. Specimens were also shown of *Chrysophanus dorcas* and *epixanthe* and of the suffused female of *helloides* which has been named *florus*.

Mr. Metcalfe brought living larvæ of a *Calopteryx* and of *Sympetrum rubicundulum*. He also showed specimens of the imported beetle, *Nacerdes melanura* which he had found in large numbers on a wharf in the Canal Basin at Ottawa on the 13th July last. Dr. Fletcher stated that it had also been found under similar circumstances in Montreal and Mr. Harrington had once taken it at Ottawa. Mr. Metcalfe said that he had taken it abundantly and frequently in Toronto among the produce warehouses on Front street. Mr. Metcalfe also showed a small collection of insects taken at Namao, Alberta, by Rev. W. J. Conolly. Among these were noticed a specimen of the Horse Bot Fly, *Gastrophilus equi* and several specimens of *Colias criphyle*. Mr. Metcalfe also made an exhibit of three boxes of determined Homoptera and Heteroptera, among these being some species new to the district recently named for him by Mr. Van Duzee, of Buffalo, and including *Ceresa constans* which he had found abundantly on three special basswood trees at Hull, P.Q. *Telamona reclivata* was also from the same tree. Several species of aquatic bugs were examined with great interest and many questions were asked as to the habits of the species shown.

Mr. Simpson exhibited some specimens of large water bugs, Ranatra, Belostoma, etc., which he had taken at Ottawa some years ago, and also a specimen of *Zaitha fluminea* with the eggs on its back. He also exhibited some photographs by Mr. A. J. Brabazon of the Grand Pacific glacier which he had visited 14 years ago, and also one of the same glacier taken by Mr. D. H. Nelles during the past summer showing the remarkable recession of this glacier of over 7 miles in 14 years. It was mentioned by Mr. Simpson that this tremendous wasting away of the glacier had been anticipated by Dr. Otto Klotz in 1894.

Mr. Baldwin showed a box containing insects which he had received at different times from the Ottawa Fruit Exchange, including several species of Blatta, a fine specimen of *Periplaneta americana*, and a large Lamellicorn beetle. Among specimens taken at Ottawa was a fine specimen of *Albuna pyramidalis*.

Mr. Letourneau exhibited some specimens of the Wanderer,

*Feniseca tarquinius*, also the curious pupa and a well blown larva, all collected at Ottawa. The butterflies were rather abundant for one or two days near the Experimental Farm last season, but as a general thing this is rather a rare species at Ottawa. It was explained that the larva feeds upon the Woolly Aphis of the Alder.

Mr. Gibson showed specimens of the Oriental Moth, *Cnidocampa flavescens*, which had been reared from cocoons received from Prof. H. T. Fernald, of Amherst, Mass. The history of the occurrence of this insect was given as related by Prof. Fernald in his bulletin No. 114. Riker mounts were exhibited showing the development of the larvæ of *Halisidota caryæ* and *H. maculata*, both of which had been particularly abundant during the past summer in eastern Canada. Reference was made to the irritating hairs of these species which led up to a discussion on the Brown-tail Moth. An account was given of the wonderfully successful efforts being made by Dr. Howard and Mr. Kirkland in the New England States and also by the Government of Nova Scotia in that province towards the control of this serious pest. Mr. Gibson showed also a series of imagines of the larvæ of *Iris iridella*, running almost from pure red to black, without any admixture of the other colour.

W. S.

## COUNCIL MEETING.

A meeting of the Council of the Ottawa Field Naturalists' Club was held on December 10th in the Normal School with the President, Mr. W. J. Wilson, in the chair. Members present were: Messrs. A. E. Attwood, A. Halkett, E. E. Lemieux, H. H. Pitts and T. E. Clarke, Miss Q. Jackson and Miss I. Ritchie.

The following were elected ordinary members: Messrs. R. W. Brock, M.A., Wm. Young, B.Sc., Jas. G. Wallace and W. E. Carson.

It was decided that all mail matter, unless specially addressed to the officers of the Club, should be delivered at the Secretary's address. This decision was caused by the difficulty of taking care of the exchanges received at the Normal School.

## REVIEW.

### SUMMARY REPORT OF THE GEOLOGICAL SURVEY FOR THE CALENDAR YEAR 1907, PP. 132.

This report, as usual, records the additions that have been made to the Geological Museum during the year. These include a large number of mineral specimens and fossils collected chiefly by members of the staff. Mr. Spreadborough, who collected on Vancouver Island during part of the summer, sent in skins of 94 mammals and 172 birds, and in a few weeks Mr. Harold Tufts collected 171 skins of birds and mammals in Nova Scotia. From the Ottawa region two interesting specimens were secured, one an albino Virginian deer, from North Wakefield, the other a black chipmunk from Kingsmere. The museum staff, in anticipation of the completion of the new Victoria Museum, is collecting material for exhibition there and Prof. Macoun reports that in addition to the mounted specimens in the museum, 2,302 bird skins and 1,106 skins of mammals are stored in air-tight boxes and unless for purposes of comparison will not be disturbed until needed for the new Museum. Mr. Spreadborough is in the field this winter hunting and trapping large mammals. Of the mammal skins now stored away, 439 are of large mammals and 667 of small ones, sufficient material in itself to make a very creditable showing. Over 72,000 sheets of flowering plants in the herbarium have been catalogued and numbered. A collection of woods on a large scale was commenced last summer and trunks of 41 species of trees were secured. A series of tree photographs was begun at the same time, forty species being photographed. These photographs will be a permanent record of our forest trees and the condition of the forests at the present time. As is the case with all reports issued now by the Geological Survey, a very complete and carefully prepared index closes the volume.

## THE NATURALIST WRONGLY PAGED.

For some unexplained reason the paging of the last number of THE NATURALIST was changed by the printer. The October number ended with page 120, but the November number begins with page 153. The error was not noticed by the Editor until after the November issue was distributed, and nothing can now be done to rectify it. Pages 121-152 inclusive will be missing from Vol. XXI.

# THE OTTAWA NATURALIST

VOL. XXI. OTTAWA, FEBRUARY, 1908 No. 11

## THE LIFE HISTORY OF THE HONEY BEE (*APIS MELLIFICA*).*

By Percy H. Selwyn.

Before speaking of the bees themselves it may be well to say a few words in regard to the wax combs on and in which these interesting insects live and move and have their being. When in a wild state the bees are necessarily their own architects and build their combs to suit their own tastes and also to suit the environment of their self-chosen abode—probably in some hollow tree. This results in combs of every size, shape and thickness, and also in an excessive amount of drone comb, which the bees appear to favor as a receptacle for their honey, but which the practical bee-keeper considers most undesirable. The two combs which you now see were taken from an ordinary eight-frame Langstroth hive, which is in general use both in Canada and the United States at the present time. One of these combs consists entirely of "*worker*" comb, while the other is mainly "drone" comb and is the result of the bee-keeper having used a narrow strip of comb foundation in the frame instead of a full sheet.

Since the invention and introduction of artificial comb foundation, which is all stamped with the base of worker cells, the practical bee-keepers of to-day do not consider it either advisable or economical to allow their bees to build their own combs. The reason for this is self-evident when it is known that in order to produce a pound of wax (the amount of foundation required for eight frames) it is necessary for the bees to consume upwards of 20 pounds of honey, which at the ordinary market price would be worth $2.00, whereas a pound of wax foundation costs approximately fifty cents. The combs which

* This is a condensed report of an Address delivered before the Ottawa Field Naturalists' Club, Jan. 21st, 1908.

result from its use are both straight and of even thickness, as well as being all worker comb, a feature which has a most important bearing on the economic side of bee-keeping. Another point in favor of its use is the great saving of time to the bees, and time in their case means honey. If a strong swarm of bees is provided with a hive containing eight frames filled with comb foundation, it is almost certain that within 24 hours they will be found perfectly elaborated or drawn out into cells, so rapidly do the bees work. If on the other hand they are provided with empty frames or frames containing small "starters" of foundation, it is probable that six or seven days at least will elapse before the combs are completed, and during this time a large number of bees are devoting their time and energy to comb building instead of gathering honey.

In this portion of the Dominion owing to the length and severity of the winters, bees have to be safely housed during at least five months of the year, generally from about November 1st to April 1st. During this period of enforced idleness the bees cluster on and between the combs in a more or less oval mass in close proximity to the honey on which they have to feed. Not only do they occupy every bit of space between the combs, but, in order to make the mass more compact, nearly every cell in the area of comb on which the bees are clustering contains a bee, these bees having entered the cells head first. That they do not remain in the cells all winter is obvious as they must come out to feed, but it is presumed that others take their place. The amount of food consumed during the winter varies considerably with the conditions under which the bees are wintered—the colder their winter quarters are, the more honey they will consume. Twenty-five pounds of honey is considered to be a safe amount to carry any hive through the winter and also to provide for the early spring, when little nectar is available in the flowers. It must not be supposed that the bees are in a torpid state during their period of rest, as, though in a quiescent condition, they are very much alive if disturbed. It is of the greatest importance that bees should winter well, that is to say, with a minimum of loss as regards dead bees. Weak colonies in the spring are scarcely worth keeping as honey producers; it is better to take two or three weak hives and unite them, thus making one profitable colony, rather than to allow each of them to gradually dwindle away until they cease to exist, which is the usual fate of weak colonies. After bees are once housed for the winter the less they are disturbed the better, and while they do not appear to notice ordinary sounds the slightest jarring sensation irritates

them and should be carefully guarded against. The conditions necessary for safe wintering are briefly as follows: A dry, frost-proof cellar with a temperature between 38° and 45°, sufficient honey (say 25 pounds), perfect freedom from any shaking or jarring, complete darkness, sufficient ventilation to allow the moisture in the hive to escape, and freedom from rats or mice, which work great havoc with both combs and bees during the winter.

The time when colonies should be removed from their winter quarters depends almost entirely on the weather. If the ground is free or almost free from snow and the temperature fairly warm, the sooner they are placed on their summer stands the better. After such a long period of inactivity many of the bees have lost their full power of flight, and it is therefore advisable to choose a warm still day, with sunshine, on which to give them their liberty. After even one day of exercise the bees are able to take care of themselves and do not leave their hives unless the weather is favorable. If they are given their first flight on a cold windy day, even if the sun is shining brightly, the chances are that hundreds of bees, if not thousands, will fall to the ground and never regain their hives, particularly if rain or snow should follow the next day.

A colony of bees should, in the early spring, consist of a queen and 25 to 30 thousand worker bees. The drones, or male bees, do not usually appear in the hive until the middle or end of May, though they are sometimes found in very strong colonies much earlier. The queen is the mother of the entire colony. Her one and only duty seems to be to lay eggs, and it is said on the best authority that to lay two thousand in twenty-four hours is quite within her power. In shape the queen resembles the workers more than the drones but is longer than either, and like the workers she possesses a sting but will not use it on anything below bee royalty —that is to say, on some other queen. Unlike the workers and drones a mated queen never leaves the hive except with a swarm. The average age of a queen is probably three years, but modern bee-keepers re-queen their colonies oftener as a young queen is usually much more prolific than an old one. The worker bees, as their name implies, perform all the duties of the hive. The average life of the workers during the summer months is probably not more than eight weeks, and often less. It seems as though they actually work themselves to death, as those that are hatched late on in the summer live much longer, in fact through the six months of winter when they have no work to do. The duties of the worker bees from spring to fall are manifold,

they gather the nectar and pollen from the flowers, secrete the wax required in comb building, construct the combs, prepare food for the young larvae, carry large quantities of water, ventilate the hive and guard it against all intruders. Nectar and pollen are gathered simultaneously from the flowers, the former is carried, like water, in a sac or bag in their abdomens and is regurgitated into the cells on their return to the hive. Pollen or "bee-bread" is carried in basket-like cavities on the bees' posterior legs, and is, so to speak, kicked or rubbed off into other cells in close proximity to the larvæ for which it is intended. Propolis or "bee glue" is carried in a similar manner and is obtained from the buds of certain trees like the balm of Gilead, horse-chestnut and others. This sticky substance is used to fill up all cracks and crevices in the hive. Wax is secreted between the rings of the bees' abdomen, on the under side, and is in the form of thin white scales about one-sixteenth of an inch in diameter and somewhat circular in shape. These scales of wax are removed with the claws on the bees' hind legs and conveyed to their mouths and are then applied to the surface where comb building is in progress. The thousands of larvæ in the hive are carefully looked after and fed by the workers during the six days of their larval existence, after which the cells containing them are covered over with a thin and porous capping consisting of a mixture of wax and pollen, thus allowing the air to penetrate to the occupants in the chrysalis stage, which pure wax would not do. Pure wax is however used by the bees in capping their honey because it requires to be impervious to the air.

The drones are unlike the queen or workers, their bodies are large and clumsy and without the symmetry of either. They are quite unable to defend themselves, having no sting, and can consequently be handled with impunity. Their tenure of life is exceedingly uncertain and often terminates very abruptly. Should the condition of the weather be such that the honey flow is suddenly cut off the worker bees may, and probably will, decide to destroy not only all the drones in the hive, but also all the drone larvæ, and when this is done swarming is indefinitely postponed. In ordinary seasons drones in varying numbers will be found in all strong hives from May to about September, though after swarming is over they may be destroyed any day. The final destruction of the drones usually takes place towards the end of August, and it is no uncommon sight to see the worker bees in a dozen different hives in the apiary all persistently chasing the drones and ruthlessly turning them out to die. It is said, and I am inclined to think with some truth, that they actually sting them to death if other means fail.

In the early spring the amount of brood usually found in a hive is comparatively small, but as soon as the bees are placed on their summer stands and the active out-door work is resumed, the queen begins laying with extraordinary rapidity, particularly if the colony is strong. Within a few days, if the weather is warm enough for the bees to work, a wonderful change takes place in the hive. Frame after frame will be found filled with eggs and larvæ in all stages of growth. A square inch of worker comb contains 50 cells, counting both sides, and as there are 126 square inches in the ordinary Langstroth frame, each comb contains 6,300 cells or a total in the eight frames of about 50,000 cells. The cells of drone comb are larger than the worker and a square inch contains only 32 cells counting both sides.

Towards the end of May the hives begin to get crowded with bees, and each day adds many hundreds to their number. When these conditions prevail swarms may soon be expected, and an examination of the hives will reveal the preparations for this important event. Not only will there be a considerable number of drones in the hive but all available drone comb will be filled with eggs and larvæ in all stages of growth, even to the young drones cutting their way out. Queen cells will also be found attached to the bottoms and sides of the frames and occasionally to the surface of the combs where some inequality exists. Some of these cells will be only partly constructed and may contain eggs or still be empty, others will be further advanced, though still uncapped and will contain the queen larvæ literally floating in food which is called "royal jelly" and which looks like thick cream or cornstarch. This food is quite different to that which is given to either the drones or worker larvæ, and it is in consequence of being fed this rich nitrogenous food that a queen is reared instead of a worker, and that her organs of reproduction are fully developed which is not the case with worker bees.

As soon as one or more of the queen cells are capped, probably the next day if the weather is favorable, a swarm may reasonably be expected. Before the swarm issues, the bees, realizing that they are going to seek a new and empty home, fill their honey sacks with honey in order that they may be able to secrete the necessary wax to begin comb building in their new home, and also that they may have sufficient food should the weather be unfavorable for a day or more following their migration. The question is often asked, which bees leave with the first swarm, old or young? My experience leads me to the conclusion that both old and young alike go, and that practically

the only bees left in the hive after the swarm has issued are the very young ones, still silvery-grey and evidently hatched within a few hours. If the hive is examined an hour or two later a number of older bees will be found in it, no doubt those that were out in the field when the swarm issued. These bees look after and feed the thousands of larvæ from one to six days old and are assisted in this work by the hundreds of young bees which are hatching every hour. First swarms accompanied by the old queen usually leave the hive between the hours of 10 a.m. and 3.30 p.m., seldom earlier or later. Second and after swarms are much more uncertain in their habits, and it may almost be said of them that they will leave the hive during any hour when the sun is shining. First swarms always cluster for a time within a reasonable distance of the hive which they have left, but second swarms have frequently been known to go straight away for miles without a preliminary halt.

The first outside indication of a swarm will be an unusual number of bees about the entrance of the hive; not hanging in the listless idle manner they do for several days previously, but all excitement, running in and out of the entrance, flying a short distance only to return until at last the exodus begins in real earnest, and a wonderful sight it is to see those thousands and tens of thousands of insects all filled with the same desire to leave in the utmost haste their well provided home for one which, in the ordinary course of nature is probably as yet unfound and certainly devoid of the necessities of bee life. It is quite commonly supposed that the queen leads out the swarm: this idea is entirely erroneous, as she seldom appears until the swarm has partly issued and often she is amongst the last to leave the hive. As to how or when the new home of a swarm, possibly in a hollow tree, is selected, must always remain a matter of doubt, but it is probable that a suitable place is found by some of the worker bees during the time the swarm is hanging on the bough of some tree, and that these bees return and lead the way to their future abode. In about nine days after the first swarm has issued a second swarm from the same hive may be expected if the weather is favorable and the honey flow abundant. This second swarm will be accompanied by a young or virgin queen, and on the seventh or eighth day if a swarm is going to issue, she can be distinctly heard giving the swarming note which is called "piping," and which resembles the word "zeep" repeated several times in rapid succession at intervals of a few minutes. Her piping will be answered by other young queens which are ready to leave the cells at any time, but which are either afraid to do so,

or are prevented by the worker bees. The sound made by these imprisoned queens is much deeper in tone owing probably to their being covered up in the cells. When the second swarm has left the hive it may be followed within two or three days by a third or even a fourth. These after-swarms are small and worthless, and are frequently accompanied by two or even three virgin queens. Practical bee-keepers of the present day do not consider it advisable to allow even second swarms to issue, because in doing so the parent hive is depleted of bees to such an extent that it is practically useless as a surplus honey producer for the remainder of the season. In order to prevent second and after-swarms the queen cells must be carefully removed three or four days after the first swarm issues, leaving one promising looking cell to provide the necessary queen. This cell must be carefully watched until the royal inmate is safely hatched, otherwise the hive might remain queenless. If the queen cells are all but one removed as early as the third or fourth day, the bees may, and probably will begin others, so careful are they not to trust the fate of the hive to one cell which may or may not produce a perfect queen. In order to do this they have to turn worker cells, containing larvæ not more than two or three days old, into queen cells and provide the inmates with "royal jelly" to feed on, instead of the ordinary liquid food necessary for the worker larvæ, in order that they may now become fully developed females. If this second supply of queen cells is started they must be destroyed as soon as there is a queen in the hive, otherwise all the precaution taken may be of no avail and a second swarm will issue when least expected.

When the season is unfavourable the bees themselves decide that there will be no second or after-swarms and when this is the case they allow the first young queen which hatches to destroy all other queen cells. This she soon does by tearing out the sides of each one with her powerful mandibles and stinging the inmates to death. If several queens have already hatched there is a battle royal and the "survival of the fittest." The young queen leaves the hive to mate with the drone about the fifth or sixth day after hatching, but several days frequently elapse before this takes place. After mating she returns to the hive and does not leave it again until she issues with a swarm, probably the following spring.

A newly mated queen usually begins laying within a day or two, and rapidly fills the now almost empty combs with eggs. If no second swarm has issued the parent hive will, if the season is favorable, give a considerable yield of surplus honey, and by

the end of August it will have fully regained its normal strength. From that time onward the queen will gradually contract the space occupied by brood, and after the young bees hatch in the outer frames, the cells are left unoccupied or are filled with Autumn honey. Just as the space occupied by brood is enlarged in the Spring by the queen from the centre outwards, so it is contracted from the outside to the centre as the Autumn draws near. This contraction is necessary because in September, though the days may still be warm, the nights are liable to be cold and frosty, thus causing the bees to cluster in a compact mass, as during the winter, for the sake of warmth, and brood in the outer combs if left uncovered by bees would certainly perish. Before the autumn is too far advanced it is always advisable for the beekeeper to make sure that none of his colonies have become queenless, or are in even a worse condition, viz., that of having a drone laying queen; and also to make equally sure that they have sufficient honey to carry the bees safely through the long winter. When a virgin queen leaves the hive for the purpose of mating, she sometimes fails to return and such colonies must be promptly provided with another queen, otherwise they will soon dwindle away and become a prey to the bees worst enemy, the larvae or grubs of the bee-moth (*Galleria mellanotis*.)

Under normal conditions bees will always provide themselves with a new queen when necessary, but in order that they may be able to do this successfully there must be either worker eggs or very young worker larvae in the hive and a fair number of drones still in the apiary. When the season is far advanced and the drones have all or nearly all disappeared, this method of re-queening with a virgin queen cannot be recommended, owing to the uncertainty of her finding a mate. If the colony is worth saving it will be better to purchase a mated queen from some reliable dealer, rather than trust to chance. When a virgin queen fails to mate within a few weeks after hatching, she becomes what is known as a drone layer—eggs laid by such a queen are deposited in a most irregular manner, sometimes two, three or even more in one cell. Another peculiarity is that while these eggs produce *only* drones they are usually deposited in worker cells instead of drone, with the result that the inmates when hatched are little more than half their normal size owing to not having had sufficient room to attain their full growth.

A colony which has been in possession of a drone laying queen for three or four weeks is in a sad plight and certainly not worth trying to save as it will probably contain only a few hundred bees and a varying number of dwarfed and useless drones.

# THE HONEY BEE AND OTHER BEES.

By James Fletcher, Dominion Entomologist.

At the conclusion of Mr. Selwyn's lecture upon the life and work of the Honey Bee, Dr. Fletcher spoke at some length on the points brought out by the lecturer, emphasizing what had been said with reference to the remarkable social and communistic habits of these insects, and drawing special attention to the many homologous characters common to them and human beings. As with some men, the drones made a good deal of noise, fussed a good deal, ate a good deal, and knew how to stay where it was comfortable. The hard working females on the other hand spent their whole lives in keeping the house in order, in feeding the young and the almost worthless drones, and in laying up a store of food to sustain the colony through the winter.

They illustrated every virtue we are taught to admire in mankind, industry, providence, love of home, and loyalty; even to the extent not only of feeding their queen from the time she hatched from the egg and throughout her whole life, but they went so far as to keep her in order and make her do what was good for her, sometimes against her own will.

The speaker said:—

Every incident in the life of a colony of bees has been so fully treated of by Mr. Selwyn that it is unnecessary to add anything further on that subject. The Honey Bee is not a native of North America, but was certainly introduced very early in the settlement of the country. The colonies of wild Honey Bees which are sometimes seen in the woods, have merely originated from swarms which left apiaries in the vicinity and then established themselves in some convenient hollow tree. There are, however, many kinds of wild bees in Canada which are well worthy of study by naturalists; but none of which produce honey of commercial value. Some of the Bumble Bees do, it is true, store up a certain amount of honey in their underground nests, as is well known to all school-boys, and this is of a very rich aromatic flavor; but unfortunately this honey is small in quantity, and moreover has the unpleasant effect of producing intense headache in the case of many people who eat it.

The Bees belong to a very large order of insects known as the Hymenoptera or membrane-winged insects. When wings are present there are two pairs, with but few veins and having the upper and lower wings on each side held together in flight by means of a series of hooks.

The mouth parts are constructed both for biting and for sucking, the tongue often being developed into a long organ for lapping up nectar and other liquids. The mandibles of the honey bee form useful little trowels by means of which the wax is shaped into cells. The ovipositor of the females in the Hymenoptera is remarkably modified according to its required uses. Among the Ichneumon flies it is sometimes enormously developed for placing the egg where the young grub will find its food on hatching. In the genus *Thalessa*, two species of which are not uncommon at Ottawa, these egg-laying organs are upwards of three inches in length and can be driven down through as many inches of solid maple wood. Among the sawflies this organ is modified into a pair of saws, by means of which the eggs are inserted into the tissues of leaves or of stems; and, then again, among the bees and ants, as a sting it becomes a weapon of defense and the eggs are passed out close to the base instead of through the tip.

It is not quite known what all the purposes are of the poison injected by the stings of Hymenoptera. It is supposed that it is of an antiseptic nature, and that a small quantity is introduced by bees into honey before sealing up the cells, which has the effect of preserving the honey from decay. It is interesting to note that the stingless bees of the genus *Melipona* make honey, but that this honey will not keep. Among several of the Solitary wasps, the sting becomes a very important instrument; for by its means the food of the young, which consists entirely of other insects, is paralyzed and it has been found that the venom of bees and wasps is chemically almost identical in composition with chloroform; consequently, caterpillars or other insects stored away as food for the young wasps, after having been stung, remain alive and fresh, but perfectly senseless, for a long time. I have sometimes taken caterpillars from sand wasps which had stung them and were dragging them away to their nests, and these have remained almost without motion, but evidently alive, for many days; they have even, in one or two rare instances, gradually recovered so as to be able to crawl away.

The stings, then, of wasps and bees, it may be remembered are provided for useful purposes and not for stinging careless and thoughtless people. There is no doubt that bees are much

more aggressive to some people than to others; but, as all bee-masters know, it is very seldom that they will sting if certain precautions are taken. When moving about among the hives you should never stand immediately in front of a hive, nor hit at the bees when they circle round your head. Occasionally, however, it may be necessary to kill a very persistent or irritated bee. You can generally tell by the note emitted when a bee is angry; but anger among bees, as with human beings, must always be regarded with pity, particularly so in the case of bees, because their excitement is only over-zeal in protecting the home against a supposed enemy. The sting itself is a rather complicated organ consisting of barb-tipped darts which run down through a sheath and are controlled by levers. The venom is produced in a poison-gland and is stored in a special sac till required. Morphologically, the sting is composed of six separate parts. When a bee stings, the sting remains in the wound by reason of the barbs and the insect soon dies from the mutilation. In this bees differ from wasps, which have smoother stings and can use them repeatedly. The changes in the different stages of the Hymenoptera are what is known as "complete," that is, the larva is very or *completely* different from the pupa, and the pupa from the perfect insect, and, notwithstanding that these insects show to the greatest degree what we call intelligence and live the most specialized or highest kind of life, the young are more helpless and dependent on their parents for food and safety than in any other class of insects. With the Solitary wasps and bees a supply of food is stored in the cell with the egg, so that the young grub on hatching finds all it requires close at hand. With the Social wasps and bees, and all the ants, the workers feed the young all the time until they are full grown.

The Hymenoptera constitute an enormous order embracing in North America upwards of 8,000 species and include insects of most diverse habits and structure. Bees, wasps and ants are among the best known representatives of the order; but here we also find the large and important families of parasitic ichneumon flies, the small but most useful Chalcids and also many gall flies and sawflies.

A point of some interest to those who do not study insects, is the difference between wasps and bees. In general appearance these may, as a rule, be readily distinguished; but their habits are also quite different. All bees feed upon nectar and pollen, while wasps feed upon animal food, particularly other insects. They are also, it is true, very fond of sweet substances, such as the juice of fruits, and will even steal honey from bees;

but this food must be considered as exceptional. The young are probably fed entirely upon animal matter. As a typical example of wasps, there is no better than the large black and white species so common here, which builds the large oval paper nests which may be often seen hanging to trees, shrubs and sheds, and which are generally spoken of in this country under the name of "Hornets." The true Hornet, however, is a very large and exceedingly venomous tawny species found in Europe, and which, strange to say, has in some way been imported into the State of New Jersey, where Prof. J. B. Smith tells me that in some places it is not uncommon. Even in the case of wasps which are useful insects which destroy many injurious species, the sting is not produced on all occasions and without provocation. Unless molested or when their nests are interfered with, our wasps and, even the formidable European hornet, will seldom sting. It is claimed by one of our members that even when by accident he had broken down the nest of a colony of wasps, by standing perfectly still until the insects had settled down, and then moving away very quietly, he has escaped without a single sting. It must be acknowledged, however, that it requires a good deal of coolness and pluck to carry out such a programme. The Social wasps live in colonies similar in many ways to those of the honey bee, consisting of males, females and workers. The winter, however, is passed by the queens or impregnated females only, all the males and workers dying before winter. In the spring each female starts a new nest, and all of the first young produced are workers, who soon build up a new colony. Perfect males and females appear towards winter. Wasps, as a class of insects, are divided into first, the *True Wasps* which have the fore wings folded lengthwise when not in use. Here we find not only the large black and white wasp mentioned, but also the Yellow-jackets, which are social in habit, and a large number of solitary wasps, in which only males and females are developed; and secondly, the *Diggers*, which are always solitary, including the Carpenter, Mining, Digging and Mason wasps.

All bees belong to a super-family known as the *Apoidea*, in which we find social or solitary species with the tongue long or short, and the hind legs or the under side of their bodies furnished with brushes for carrying pollen. Bees of all kinds are very beneficial from the good work they do in cross-fertilizing the flowers of fruit and other trees while visiting them to gather nectar or pollen. The two most conspicuous divisions of the bees are the Honey Bees and the Bumble Bees. These latter are social in their habits in a similar way to the Wasps.

in that it is only the perfect females which pass over the winter, and in the spring each of these starts a new colony. Their nests are for the most part rather clumsy, untidy structures, the cells being irregular in shape and formed in a mass of pollen and honey. Owing to the length of their tongues, Bumble Bees are useful in pollenizing clover and were actually imported into New Zealand for this very purpose some years ago. Closely resembling the Bumble Bees are some species of *Apathus*, which live in the same nests with them, but are parasites or at any rate do not help in the work of the colony, and the females have no collecting baskets on their legs for carrying pollen. The large Carpenter Bee of Western Ontario, *Xyloöpa virginica*, which somewhat resembles a Bumble Bee, makes tunnels half an inch in diameter and several inches long into the solid wood of sheds, houses and other buildings.

Very interesting insects are the Leaf-cutter Bees, (*Megachile*) which make their nests of several cells each one from half an inch to three-quarters of an inch in length, and neatly incased in round pieces cut from the leaves of roses, maples and other trees. Each of these cells contains a single egg and a mass of "bee-bread", pollen and honey, sufficient to feed the young larva to full growth. A small group of bees known as the Nomads are parasitic in the nests of other bees.

The large group of *Andrenidæ* consists of short-tongued bees which dig out galleries beneath the surface of the ground. Some are solitary, as in the case of the true Andrenas, in which a single burrow may have four or five cells made by one female; or there may be large colonies, as in the genus *Halictus*, in which many females use the same common main shaft; but each has her own little gallery running off from this.

The Hymenoptera present so many features of extreme interest, and they are of such importance in their rôle of parasites as the main controllers of the undue increase of injurious insects that the special study of any one of the groups would provide a life work of the greatest fascination to anyone who would devote time to it. I feel sure that all who have listened to Mr. Selwyn to-night must be convinced that a study of any of these insects would well repay them.

## BOTANICAL NOTES.

RIBES RUBRUM, L.

Mr. M. L. Fernald in *Rhodora* vol. IX, pp. 1-5 separates the species that have been referred to *R. rubrum*. There are two cultivated species of red currant, the one, *R. rubrum*, has the calyx somewhat cup-shaped, brown or mottled with red and destitute of a disk, the other, *R. vulgare*, Lam., has a flat, yellowish green calyx and bears a prominent disk. The latter is the common species of cultivation. Mr. Fernald does not know of the occurrence of *R. rubrum* in a wild state in America and all our specimens are plainly referable to *R. vulgare*. Of the indigenous wild currant Mr. Fernald recognizes two varieties, *R. triste*, Pall., and *R. triste* var. *albinervium* (Mx.) Fernald. The latter has the leaves sparingly pubescent beneath when young, soon glabrate, and is by far the most common red currant in Canada, ranging from Nova Scotia to Alaska. *R. triste* is permanently white tomentose beneath, and though its range is stated by Mr. Fernald to be "Newfoundland to Alaska," it has been seldom collected in Canada, and when the habitat is given it has always been where the rock of the vicinity is calcareous.

---

PRIMULA FARINOSA, L.

Mr. Fernald separates this widely distributed species into *P. farinosa* and three varieties—*Americana*, *macropoda* and *incana*. Typical specimens of all four are found among the large series of Canadian specimens in our herbarium, but intermediate forms also occur, especially in the west. As shown by our specimens, *P. farinosa* is confined to Labrador and Newfoundland, *Americana* to the vicinity of the Great Lakes, and *incana* to the Rocky Mountains and western Alberta, while *macropoda* ranges from Labrador to the Mackenzie River. In the west it is sometimes difficult to decide whether flowering specimens should be called *incana* or *macropoda* but *incana* is the characteristic plant of the foot-hills and *macropoda* of the prairies. *Americana* as described by Mr. Fernald, however, might well be considered a species, its very short bracts and calyx separating it from *macropoda* and *incana* and the *sulphur-yellow* powder of the under surface of the leaves from *P. farinosa*. Our specimens of *Americana* are from Johnstone's Harbour, Lake Huron and from Lake Superior, the latter specimens collected by Prof. Macoun, July 16th, 1869. We have also very characteristic specimens from Michigan.

J. M. M.

## REPORTS OF SOIREES.

There is no part of the work of the Field Naturalists' Club upon which more care is bestowed than on the preparation of the programme of winter lectures, and it is doubtful whether in the history of the Club there has been a better programme than that offered for 1907–8. It is through its lectures and informal talks that the Club comes most directly in touch with the public as the audiences are made up in great part of those who while not members of the Club are specially interested in and attracted by the subjects upon which addresses are given. The opening evening is always made as attractive as possible and this year short talks were given on "Personal Experiences in the Field during the past season" by five of the Club's oldest members,in the Assembly Room of the Normal School December 10th. Dr. J. F. White the Principal of the Normal School in a short address of welcome complimented the Club on the good work it was doing and assured its members of the hearty co-operation of himself and his staff in this work. He was followed by Dr. S. B. Sinclair whose "personal experience" described a fire which had been neglected near where he had spent the summer in the Parry Sound district and which after it had spread until it seemed to be beyond control was systematically and heroically attacked by himself and seven neighbors and after five days work was stamped out, although everything was as dry as tinder and the wind blew almost continually. He learned there that fire usually travels very slowly, if at all, during the night and that sand extinguishes fire as effectively as water and is usually much more easily obtainable. A full report of Dr. Sinclair's address, which was illustrated by several beautiful lantern slides, will be published in the March number of *The Canadian Forestry Journal.*

Dr. Fletcher who can carry his audience with him to whatever place he may be describing and make them see not only the place but what he saw when there, took them to the tops of some of the highest mountains in British Columbia and told them of the elusive butterflies and other insects he had seen and captured there. Veritable "Mountain Sprites", only to see them in their wind-swept homes amply repaid the enthusiast who went in search of them. His address in a condensed form will be published in the March number of THE OTTAWA NATURALIST.

Although Dr. Ami had spent a considerable part of the past season in field work he also represented the Geological Survey of Canada at the Centenary of the Geological Society of London, and by special request told of the meeting in London and some of his experiences there What impressed him most was the appreciation shown by European geologists for the work of Canadians and the high estimation in which Canadian geologists are held by their confreres in England. No effort was spared to make the meeting a success socially as well as scientifically, the only drawback being that there was more to be seen and heard and done than there was time for.

A condensed report of Mr. F. T. Shutt's address on "Rain and Snow" was published in the December number of THE OTTAWA NATURALIST and a synopsis of Mr. A. Halkett's "Observations in the Provinces of Alberta and Saskatchewan" will be found in the "Report of the Zoological Branch" published last month.

As is usual at the opening meeting there was an exhibition of specimens which included representatives of all branches of Natural History.

Dr. Bryce always has something of value to tell his audience and always tells it in an interesting manner, but it is not often that a lecturer addresses a more attentive audience than listened to him at the Carnegie Library, January 7th, when he lectured under the auspices of the Club on "Some Sanitary Considerations in the Construction, Heating and Ventilation of Dwellings." As Dr. Bryce's lecture will be published in THE OTTAWA NATURALIST at an early date no report of it need be given here. The Report of the Zoological Branch which has already been published was read at this meeting.

J. M. M.

## MEETING OF THE BOTANICAL BRANCH.

The third meeting of the Botanical Branch was held at the home of Mr. A. E. Attwood January 18th. The members present were Messrs. Fletcher, Harrington, Cameron, Blackader, Campbell, Carter, Whyte, W. T. Macoun and J. M. Macoun. Mr. Attwood as a subject for discussion read the botanical part of a draft programme for Nature Study work in the lower grades of the Public Schools, now in course of preparation. He explained that his object in reading this tentative programme

was to secure from those present their opinions as to the best methods to pursue. Nature Study work will begin as soon as a child leaves the kindergarten and enters the Public School proper, and it was important that at the very beginning instruction should be on lines that would be followed as the child advanced from grade to grade. A great variety of opinions was expressed by those present, some being of the opinion that all Nature Study teaching should have a practical side while others considered its more important function to be the training and development of the child's natural powers of observation without special attention being paid to the practical application of what was taught. There was a difference of opinion, also, as to whether Nature Study should not form part of the Natural Science Course, one or two thinking that the two should be kept quite distinct, the Nature Study work being kept as non-technical as possible; but the general feeling was that while all Nature Study work was not scientific, all Natural Science studies were really part of Nature Study as it should be taught in the schools. Lists of the best seeds of flowers, trees and shrubs to be used for illustrating the mysteries of germination; lists of shrubs and trees from which the buds most suitable for Nature Study instruction could be procured and lists of plants to be studied in the Spring and Autumn were submitted and discussed.

J. M. M.

## COUNCIL MEETING.

A meeting of the Council was held on January 6th in the Normal School with the President, Mr. W. J. Wilson, in the chair. Members present were: Messrs. A. E. Attwood, A. H. Gallup, J. W. Baldwin, A. Gibson, E. E. Lemieux, and T. E. Clarke; Miss Q. Jackson and Miss A. L. Matthews.

The following were elected ordinary members: Messrs. Hiram Robinson, Morley E. Wilson, and J. P. Finn, B.A.

The President informed the Council that the room in the Normal School which the Club had been privileged to use as a library would no longer be available since it had been found necessary to make use of it for school purposes. A committee consisting of Dr. Jas. Fletcher, Dr. H. M. Ami and Mr. A. H. Gallup was appointed to see if a suitable room could be secured elsewhere.

*Alpine Flora of the Canadian Rocky Mountains*, by Stewardson Brown. Illustrated with 31 water-color drawings and 91 other illustrations by Mrs. Charles Schaeffer, pp. 352. Putnam's Sons, New York. $3.00.

*Contributions to a Catalogue of the Flora of the Canadian Rocky Mountains and the Selkirk Range*, by Edith M. Farr. Contr. from the Bot. Lab. of the Univ. of Penn. Vol. III. pp. 1-88. Bot. Dept., Univ. of Penn. $1.00.

Among those who visit the Canadian mountains the greater number perhaps go chiefly to revel in the unrivalled scenery of the Rockies and Selkirks or to climb the peaks that tempt them on every hand. But there are few who can spend even one day in the mountains without feeling the desire to know at least the common names of some of the beautiful wild flowers that fill the woods and meadows and cover the mountain slopes with masses of brilliant color. Mrs. Henshaw's "Mountain Wild Flowers of Canada"* will long remain the "popular guide to the names and descriptions of the flowers that bloom above the clouds." Written by a good botanist and one who is an ardent lover of flowers it appeals to the Nature lover in a way that no "Flora" or "Catalogue" can do, and Mrs. Henshaw seems always to have found the exact word to describe the characteristic beauty of the plant she may be writing about, a matter of greater difficulty than is realized by one who has not attempted it.

While Prof. Brown's book is very far from being a complete "Flora" of the Rocky Mountains it is strictly "scientific" as far as it goes, and the amateur botanist who so dearly loves to "analyse "and "classify" the plants he collects will find that he can with this book identify all the commoner species at least, that he will find in the Rockies or Selkirks, for though the title covers only the Rocky Mountains the matter includes the Selkirks as well. The average tourist, however, will prefer Mrs. Henshaw's simpler, if not very scientific, arrangement of the alpine flowers in groups according to their color, as by this means he can in a very short time learn the names of the plants he has collected. Beginning with a general key to the families, Prof. Brown gives briefly and clearly the characters of each family and of the genera into which they are divided. The number of species in each genus is as a rule so small that the characters separating these are not given in the form of a key but will be found in the descriptions of the species themselves. These descriptions are with very few exceptions accurate and not unnecessarily long. The habitat of each species is also given

* Reviewed in the Ottawa Naturalist, Vol. XX, p. 114.

and its distribution in a general way. Had one or two localities been mentioned at which collectors could find each species, the value of the "Flora" to the traveller making only a short stay in the mountains would have been greatly enchanced, but as this defect is covered by Miss Farr's "Catalogue" which is a natural, and indeed a necessary complement of the "Flora" it will not be felt to the degree it would have been had the "Catalogue" not been published. The names used by Dr. Brown are those approved by the school of American botanists who have not accepted the "Vienna Rules." No objection could be taken to the use of this system of nomenclature were any synonymy given but one not familiar with some of these new names will be unable to decide whether they are applied to new segregates or are only new names substituted for the old familiar ones, which will generally prove to be the case. This defect is also remedied, however, by Miss Farr's "Catalogue." In her preface she says candidly: "The nomenclature is in accordance with the best judgment of the author," but "one synonym is given under each species where from familiar usage in the past such a course seems desirable." A strict application of the "Vienna Rules" will result in the changing of very few of Mrs. Henshaw's names and fewer still of Miss Farr's.

Of Mrs. Schaeffer's illustrations nothing but praise can be said or written. If a very few of the colored illustrations are a little "off color" the fault lies in the difficulty of reproducing in color the delicate shades so characteristic of many alpine flowers, and Mrs. Schaeffer's illustrations are much the best the writer knows of in any American work of this kind, and there is not one of them that would not serve to identify immediately the species it is intended to represent. The half-tones are also excellent and the reproduction on the same plate of an inch measure makes it easy to determine the relative height of the plants reproduced. A comparison is naturally suggested between Mrs. Henshaw's book and that of Dr. Brown and Mrs. Schaeffer, but such a comparison cannot be made. Each is excellent in its own way. Some will prefer one and some the other but the qualities that make both good, and each in some respects better than the other, are so diverse that no one with the smallest interest in or love for flowers can visit the Canadian mountains and afford to be without either. The publication of two such books is of vastly greater significance than may appear to the unthinking. They will serve to advertise our mountains and attract visitors not only from the United States but from Europe, and what the average Canadian may not know is that though transportation companies, hotel-keepers and even the

Government have for many years exploited the mountains of the Western States no such books as either of these have been published on the flora of these mountains, a fact sufficient in itself to show that they do not offer the attraction to the tourist and Nature lover that our Canadian mountains do. These books and the work of the Canadian Alpine Club will do more to attract strangers to our mountains during the next five years than anything else will. It is to the credit of the Canadian Government and the Canadian Pacific Railway Company that this is not only appreciated by them but that their appreciation has been shown in a practical way by affording every possible assistance to the authors of these books and to the officers of the Alpine Club in the prosecution of their work.

Miss Farr's "Catalogue," as has already been said, is the natural complement of both of the books referred to above. But it is something more than a Catalogue Like Macoun's "Catalogue of Canadian Plants" which gives the general distribution of all the species of flowering plants which were known to occur in Canada at the time of its publication and also the particular localities at which rare species had been collected, Miss Farr mentions a locality in either the Rockies or Selkirks, or both, at which each species may be found, which makes it possible for one who has only a part of one season to spend in the mountains to collect most of the species known to occur there. The "Catalogue" is also a practically complete list of the plants of those parts of the Rockies and Selkirks that it covers. Based on her own collections in 1904 and 1905 Miss Farr has added to her own list all species reported by other collectors. That a *complete* list of the plants of any region should be published is of course out of the question. All that anyone can do is to publish a list of the plants *known* to occur and this Miss Farr has done. Botanists like Prof. Macoun and Dr. Fletcher who have collected in the Rockies and Selkirks for more than twenty years could add a good many names to even Miss Farr's list, but these names have not been published, and indeed some of the plants collected by them are listed for the first time in Miss Farr's "Catalogue." To the professional botanist the "Catalogue" will prove more valuable than either the "Flora" or Mrs. Henshaw's book. The amateur botanist and the casual visitor to the mountains will find it an absolute necessity, for they will certainly find many species that neither Mrs. Henshaw nor Dr. Brown has described, but which are catalogued by Miss Farr.

J. M. M.

# THE OTTAWA NATURALIST

VOL. XXI. OTTAWA, MARCH, 1908 No. 12

## MOUNTAIN SPRITES.

By Dr. James Fletcher, Ottawa.

(Delivered Dec. 10th at the opening meeting of the Winter Course, 1907-8.)

As I came into the hall this evening I was asked whether Mountain Sprites were birds, beasts or fishes, or at any rate to which branch of natural history sprites belonged. A sprite the dictionary tells us is a spirit, a shade, an apparition, and I have never yet found in nature anything to which such a title could be quite so appropriately applied as to the very elusive soberly coloured or extremely active butterflies which one finds on the summits of high mountains, where they flit up suddenly from the broken rocks, appear for a second or two and then close their wings and drop into a crevice or over a precipice where pursuit is impossible. Another disconcerting device is to drop suddenly to the ground and feign death, when followed closely, where they lie over sideways among the broken rocks with which such places are strewn, and thus become instantly and most effectually invisible. On the other hand these attractive creatures may come dashing at you out of space as soon as a ray of sunshine warms up the snow fields or rugged rocks, and then as suddenly disappear over a cliff or beyond a pile of rough boulders where pursuit is most difficult.

It may not be amiss to remind you, here, that chasing butterflies in the rarefied atmosphere and among the loose rocks on the bare summits, or on the boulder-strewn slopes of a mountain over 8,000 feet high, is an entirely different proposition from even a long trying chase over level meadows and through the woods of the lowlands. The very fatigue of violent exercise of all kinds at such heights is a factor which constantly forces itself upon one. Added to this any recklessness, accidental stumble or mis-step near the edge of a ravine may easily result in a serious accident, involving perhaps a sudden and involuntary descent of some thousands of feet.

There are many species of fragile butterflies and insects of all kinds, which are found only on the bleak and wind-swept summits of high mountains. These are naturally, on account of their rarity in collections, a great attraction to entomologists whenever opportunities occur of seeking for them in their native haunts.

In response to the President's invitation to speak for a few minutes this evening on "a collecting experience of the past summer," I am going to tell you of a short expedition made on the 4th of August last in company with my friend Dr. Henry Skinner, of Philadelphia, the well known authority on many branches of entomology and the Editor of Entomological News. The chief objects of our search were some species of mountain butterflies discovered by Mr. T. E. Bean whose excellent work on the butterflies of the Canadian Rockies has made Laggan, the place where he lived for some years, a classic ground for entomologists. We decided to stop at this Mecca and endeavor to secure among others, specimens of *Argynnis alberta*, Edw., and *Œneis beanii*, both discovered for the first time by Mr. Bean in this locality. The chief object of our search, however, was the beautiful and most interesting *Argynnis astarte*, Dbl.-Hew., which has a very interesting history. This butterfly had been described in 1848 from a specimen brought back to England by a collector sent out by Lord Derby.* Owing to the small appreciation of the value of exact localities in those days and even to-day with some of the entomologists in Europe who deal with all-world collections, the inaccurate and indefinite locality given on this specimen was "Jamaica," which was one of the points of call of the collector in proceeding to or from North America. In 1888 Mr. Bean who was then living in the Rocky Mountains, re-discovered the species which had been a mystery to all entomologists from the time the single specimen was taken back to Europe. As Mr. H. J. Elwes, one of the most astute of the English lepidopterists, wrote to me just about that time, it seemed almost impossible that a species with the general appearance of *A. astarte* could be a tropical insect, and he felt sure that this insect would prove to be an arctic or high alpine form, which would be found in the Rocky Mountains if anyone would go and search for it. He even offered to subscribe £200 towards such an expedition. Just about this time, by a curious co-incidence, Mr. Bean sent specimens of the butterfly, together with several other new species, to Mr. W. H. Edwards of Coalburgh, W. Va., for identification, and Mr. Edwards had decided to name it *A. Victoria* after our late beloved Queen, Victoria the Good. This fine

insect is not only extremely rare and difficult to obtain because of the inaccessibility of its habitat, but is exceedingly active and difficult to catch even under the most favourable circumstances.

We arrived at Laggan Station on the Canadian Pacific Railway on the morning of August 3rd. The station is almost at the highest point reached by the railway (alt. 5037 feet above sea-level) in passing over the main chain of the Rockies, and is close to the dividing line between the provinces of Alberta and British Columbia. It was a glorious morning and we enjoyed thoroughly the drive of four miles or thereabouts up through the woods to the Chalet Hotel on Lake Louise. Our hopes rose to a high point as we saw the numerous butterflies and other insects flitting along the flowery banks of the roadway. Having arrived at the Chalet, perhaps the most picturesquely situated and luxuriously comfortable, even of the Canadian Pacific Railway hotels, we at once made preparations for our journey up to the happy hunting grounds on the top of Mount St. Piran, a mountain towering up 8,500 feet to the south of Lake Louise. Alas, however, we were to be disappointed. Lake Louise, which on our arrival, from its beautiful colour well deserved its original name of Emerald Lake, in an hour's time was entirely changed in appearance, for heavy black clouds rolled over from Mount Lefroy and Victoria Glacier, and very soon descended in such a torrent of rain as only can fall in the mountains. Frequent showers followed throughout the afternoon which made an ascent of the mountain quite out of the question. Short excursions, however, along the side of the Lake and along the carriage drive, enabled us to secure some insects of interest. Among these were specimens of a reddish "black fly" (*Simulium fulvum*, Coq.) which little knowing their danger were stupidly persistent in circling around our heads. On the flowers of the tall Spiked Willowherb and the large golden flowers of an Arnica, we secured many bumble bees and a few Plusias. While waiting in a boathouse between showers several specimens of two species of mosquitoes were enticed from their native wilds to our collecting boxes.

The next morning we were up bright and early, and although the day was not very promising, we started up the mountain in a light shower of rain, hoping that on the summit conditions would improve.

To those who have never enjoyed the exquisite pleasure of threading their way up through the rich forests which clothe the bases of our grand mountains in any of the great chains of the Rockies, and then on through the diminishing groves of

trees, shrubs and bushes to the delightful flower-laden mountain meadows above, the idea that every fresh zone of vegetation is teeming with animate life characteristic of each altitude, must come somewhat as a surprise. This, however, is known actually to be the case by all who have been fortunate enough to enjoy such a climb as my companion and I did last August. From the base to the very summits capped with snow, which at a distance seem to be so bare and forbidding, we find that not only the plants but the animals, birds, and insects, keep rapidly changing with each succeeding modification of the conditions of life, due to the varying altitudes. The recognition of the various denizens of the mountain forests, streams, meadows, and rocky crags, as each group appears and then gives place to others better able to stand the rigours of higher altitudes, gives an indescribable charm and exhilarating zest to an ascent of one of these mountains.

On leaving the hotel we pushed on through the woods with our eyes ever on the alert to notice the different trees shrubs and abundant flowering plants. A circuitous path up the side of the mountain brought us to the Lakes in the Clouds, Lake Agnes and Mirror Lake, two beautiful pieces of water which lie on the flanks of St. Piran. Here we hoped to find *Argynnis alberta* among the shrubs and low groves of conifers, but we were too late in the season to get this local treasure. Above the lakes the mass of the mountain slopes away gradually to the summit over meadows which were ablaze with lovely alpine flowers and where clumsy bumble bees hummed busily from one bright blossom to another. Many of these beautiful mountain blossoms were of so much interest that we cannot pass them by, and indeed they were the chief interest of our expedition, for with the exception of a few moths, one or two butterflies, and some small insects of various orders, found here and on the surface of the snowfields at the summit, our expedition was rather unproductive in specimens, although most enjoyable from the opportunity of seeing new friends in all forms of life, among the sublime surroundings of the mighty mountains which form the backbone of our continent. The scenery in that part of the main chain of the Rockies is beyond description magnificent. From the summit of Mount St. Piran we looked down upon the lakes below with the Chalet nestling, half hidden among the trees, at one end of Lake Louise, and further off in the valley of the Bow, a slender thread showed where the railway made it possible for new lovers of nature to come and enjoy this wonderland. Beyond this again, across the Bow Valley, was the great Sawback Range. Nearer to us

were many mountains of equal height or soaring above that on which we stood. As we watched the snowfields on Mount Lefroy we noticed what appeared to be a little puff of snow or cloud rolling down the precipitous side, and many seconds later we appreciated, by the roar of sound that was brought to us, that this had been an avalanche of perhaps thousands of tons of ice and snow which had been dislodged by the action of the summer heat.

On the whole our trip it must be acknowledged, as far as insects were concerned, was half a failure, because we did not succeed fully in the object of our quest. When we reached the summit where the butterflies we most desired are to be found, we were met by a strong freezing blast which came up from the other side of the mountain with such force as to make it at times almost impossible to stand. The sun was for most of the time hidden by rolling clouds laden with snow, which almost incessantly fell in flurries during the hour and a half we were on the summit. For a few minutes the sun came out and I saw a black object like a drifting leaf rise from a bed of broken rock and drop suddenly upon another one. This I knew to be *Œneis beanii*, one of the Mountain Sprites we were in search of. It was within a few feet of me and gave a good instance of the almost incredible difficulty of finding these insects which nature has so well protected by their resemblance to the rocks amongst which they live and by their secretive habits. I saw the little creature fall almost at my feet within a space of two feet square where not a blade of grass was growing, and yet it was only by going down on my hands and knees and picking off one by one every piece of loose stone that at last I detected it by a movement of the wing as a small piece of rock fell upon it. It feigned death perfectly and was easily picked up and dropped into the killing bottle. No other specimens were seen except one *Argynnis astarte* which Dr. Skinner says came towards him as though it had started from the south pole and when he raised his net to make a stroke, made for the north pole as if it meant never to stop till it reached there. The temperature was below freezing, snow was falling and the wind blowing a perfect gale. The sun showed no sign of being in a kindlier mood, so after a stay of an hour and a half we made up our minds to revisit again the flowery fields below. Here we were well repaid by the many objects of beauty which we found on every side. Around the Lakes in the Clouds the rocks were covered with mossy Saxifrages and the rich flowers of the Wide-leaved Willow-herb. Here also we found beds of the White Dryas (*Dryas octopetala*, L.) a low alpien

shrub with creamy white flowers, and close to the water, sturdy bushes of Labrador Tea, the same as we get in our eastern swamps, the small-leaved mountain variety *microphylla* of *Kalmia glauca* and other bog plants. Among flower-laden bushes of the White-flowered Rhododendron, the tall graceful spikes and almost tropical foliage of the False Hellebore (*Veratrum viride*), were conspicuous, together with bushes of *Lonicera involucrata* showing both the small yellow twinned blossoms and dark purple berries surrounded by their enlarged claret coloured bracts. Here too Lyall's Larch and *Abies lasiocarpa*, heavily loaded with their curious cones, drew the attention of the passer by. The striking crimson flowering spikes of the Greenland Lousewort and three other species of the same genus, *Pedicularis contorta*, *racemosa*, and *bracteosa*, all grew close together on a springy slope, mixed with the graceful white-flowered Grass of Parnassus, the large purple daisy-like flowers of *Erigeron salsuginosus*, Lewis's Mimulus, scented Valerians, golden Buttercups, Arnicas and Cinquefoils. Higher up the slope were seen beds of Alpine Asters, Golden Ragworts, some of the smaller Fleabanes and showy Pentstemons, all of which added their quota to this scene of beauty. The feathery seed heads of the beautiful Western Anemone (*Anemone occidentalis*), stood well up above the low grasses and sedges. Higher up the mountain side we found in perfection the handsome white cup-like flowers of the same plant, and higher still nearer the snow the young buds lying like white satin buttons close to the ground. With these were also the pretty blue tinged flowers of Drummond's Anemone and hosts of other alpine flowers too numerous even to mention. A word, however, must be said of the beds of mountain heather which are such a charm to all visitors to the mountains. These are of three colours and although they are not true heathers, they belong to the same natural order, the Heath family. The most beautiful is the red-flowered heather, *Bryanthus empetriformis*, then the white *Cassiope mertensiana*, which grows on St. Piran in wonderful beauty. An interesting but less showy plant is *Phyllodoce glanduliflora* which has clusters of greenish white flowers. Right on the bleak summits of these mountains large patches of the lovely little Moss Campion, *Silene acaulis*, are to be found. This little plant consists of numerous stems all bunched close together like a tuft of moss. The annual growth consists merely of half a dozen leaves and one large flower at the tip of each little stemlet, giving the whole tuft the appearance of a green cushion thickly studded with rosy pink blossoms.

As we left the Lakes of the Clouds and went down the

slope to the Hotel, we noted a few more floral treasures nestling among the feathery mosses which covered the ground everywhere among the tall trees. Here the deliciously scented Twinflowers and Single-flowered Pyrolas were abundant and the Star-like flowers of *Clintonia uniflora*, prettily called by Mrs. Henshaw "Queen Cups," looked bravely up from between their shining leaves and were intermingled with delicate orchids and many other treasures characteristic of these woods. We reached the hotel towards sunset, not particularly laden with treasures of the chase, but perfectly happy after one of the most enjoyable days we had either of us ever spent with Nature.

---

## BOTANICAL NOTES.

RHUS ITHACENSIS, Greene, Proc. Wash. Acad. Sci. VIII, 178.

*R. glabra*, Macoun, Cat. Can. Plants, I, 100.

*R. glabra* is a southern species which does not occur in Canada. An immature specimen collected by Dr. Geo. Dawson at the Lake of the Woods (Herb. No. 10069) Dr. Greene believes to be an undoubted undescribed species, but the specimen is too poor to describe.

RHINANTHUS OBLONGIFOLIUS, Fernald, Rhodora, IX, 24.

Distinguished from *R. Crista-galli* by its wider crenate-toothed leaves and the much broader yellow lateral teeth of the upper lip of the corolla. Common on alpine meadows and slopes on Table-topped Mountain, Gaspé Co., Que. (*cf.* A. *Allen*, *Fernald* and *Collins*). Several specimens in our herbarium from Labrador and the Hudson Bay region apparently belong here, but they have not retained their green color which Mr. Fernald says is a characteristic of *R. oblongifolius*.

EUTHAMIA OCCIDENTALIS, Nutt.

In thickets, Lake Okanagan, B.C., August 14th, 1891 (Jas. McEvoy). Our only Canadian specimens. Referred at time of collecting to *Solidago lanceolata*.

J. M. M.

# ON AN OCCURRENCE OF HYBOCYSTIS IN ONTARIO.

(Plate II, Figures 1-5)

BY W. A. PARKS, PH.D., ASSOCIATE PROFESSOR OF GEOLOGY, UNIVERSITY OF TORONTO.

In the Journal of the Cincinnati Society of Natural History for 1880, Professor Wetherby records the discovery of seven specimens of a remarkable organism which he describes as *Hybocystites problematicus*, referring the genus to the Cystoidea, as the name implies. The same specimens were examined by Herbert Carpenter who decided that their relationships were with the Blastoids rather than with the Cystids.* Wachsmuth and Springer in their revision of the Palaeocrinoidea, are of the opinion that these forms are really Crinoids of low organization. In view of the diverse opinions as to the proper place in a classification of this remarkable genus, it will be of interest to students of the Echinodermata to learn of its occurrence in a new locality—the first since the original discovery in Mercer County, Kentucky. The Trent Valley Canal cutting in Eldon tp., Victoria County, near Kirkfield, Ont., has yielded the University collector, Mr. Joseph Townsend, a fine series of Crinoids, Cystids and Asteroids. In working over this material one excellent specimen of *H. problematicus* and three of a new species of the same genus were found. As the present example of Wetherby's species is in a much better state of preservation than any of the original forms it is hoped that a few additional notes on the anatomy of this interesting fossil will not be superfluous. Rather than to enter the discussion as to the affinity of the organism the writer prefers to accept Wachsmuth and Springer's conclusion and to regard it as a Crinoid. The almost exact resemblance to *Hybocrinus* in the arrangement of the calyx plates and in the character of the anal orifice tend to strengthen the decision of these authors. An emended description of *Hybocystis problematicus* follows:—

*Basals.*—Five, pentagonal, the two posterior plates symmetrical and larger than the other three. This forces the column into an excentric position. (Fig. 5).

*Radials.*—The second ring of plates consists of four radials and a posterior hexagonal anal (azygous plate). This plate bears on its upper left side a small upper azygous or

* *Quarterly Journal*, Geol. Soc., London, p. 307, pl. XI., 1882.

second anal plate and on its right upper side a small fifth radial. (Fig. 5).

*Arms.*—Short, stout, consisting of five subequal, quadrangular joints. The arms curve inward over the vault. Three only occur, being borne on the anterior and the two posterior radials. The internal face of each arm is deeply excavated by an ambulacral furrow, which passes over the distal end, is continued down the outer side and is prolonged over the face of the radial. (Fig. 3).

*Calycine ambulacra.*—Two, passing from the vault over the summit of the two antero-lateral radials and continuing downwards and backwards so that the two almost meet at the posterior side of the column. The calyx plates are raised into a prominent ridge at the borders of the furrows and near their extremities these ridges unite beneath the ambulacra, so that these structures seem raised on tumid pads with crenulated edges. (Fig. 2).

*Ventral disc.*—As the radials are much inflected at their superior aspect the ventral surface is restricted. Four diamond-shaped, nodose orals occupy the interradial positions, with the exception of the posterior; here, the large anal structure has forced the oral plate inwards and upwards so that it appears as a prominent ridge bordering the anus medially. The ambulacra from both arms and calyx are continued to the centre, the furrows being arched over by rigid cover pieces so that the oral aperture is entirely hidden. No apical plate is apparent but it is possible that the proximal cover plates are so fused as to function as such. (Fig. 1).

*Ventral sac.*—A large circular, shallow depression is situated just within the anal plate. Around the border this hollow is lined by numerous minute plates while the centre is raised into a dome-like elevation, consisting of six (or possibly more) triangular plates after the manner of a Cystid. It is possible that in life this depression was a real proboscis which has been forced in by the processes of fossilization. In this event the anus was certainly situated at its extremity. (Fig. 1).

*Column.*—Round, tapering distally, composed of very thin equal joints.

*Discussion.*—The above description differs in many points from the assertions of Wetherby, Carpenter and Wachsmuth and Springer. The chief differences may be briefly stated as follows: *Arms.*—Only two joints have previously been observed; five certainly occur and no more, for the distal joint shows most distinctly the ambulacral cover plates passing over to the outside. Carpenter figures the furrows as passing

over the summit of the second joint; this must be erroneous if the species are identical. *Mouth.*—The ambulacra meet at or near the centre of the disc and do not enter the calyx at the edge of the radials as stated by Wachsmuth and Springer. A central oral aperture must exist but it is not observable, being rigidly closed in by the tight fitting and interlocking ambulacral cover-plates. Carpenter's figures of the oral aspect are extremely variable and confusing; it is difficult to co-relate his diagrams. *Anus.*—Despite Wachsmuth and Springer's objection, Wetherby's statement as to the existence of a valvular pyramid is correct. That this pyramid is surrounded by a series of small plates is here recorded for the first time. This feature tends to increase the resemblance of the present genus to *Hybocrinus*, for the same structure was observed by W. R. Billings in the latter genus and is figured for *Carabocrinus* by Wachsmuth and Springer.*

*Locality.*—Mercer County, Kentucky; Trent Valley Canal, Eldon tp., Victoria County, Ont., two miles from Kirkfield, J. Townsend, collector. No. 567 T. University of Toronto Museum.

### HYBOCYSTIS ELDONENSIS, *sp. nov.*

(Plate II., Fig. 4)

This species is founded on one well preserved, specimen although two others are at hand. The latter, however, are somewhat larger and stouter, so that, in order to avoid any specific confusion, the description is confined to the single specimen. The present species is much smaller than *H. problematicus*, being only about seven millimetres in vertical extent. It shows the same asymetric shape, the column being excentric and the vault much elevated on the anal side. The calycine plates are quite similar but the upper azygous plate is relatively smaller; its presence, indeed, is more to be inferred than observed. The ventral sac and anus are likewise similar, the circlet of small plates and the dome-like valvular pyramid being clearly shown. The ambulacral tracts on the tegmen are well closed by rigid cover-pieces which are relatively larger than in the genotype. The most pronounced difference is in the fact that the two calycine ambulacra do not extend over the basals but are confined to the radials, where they are bolstered up on relatively larger tumid pads. The cover-plates are large and distinct with the individual ossicles of the two rows alternating. There is no trace of an ambulacral

* North American Crinoidea Camerata, p. 137.

furrow on the arm-bearing radials, nor can such a depression be made out on the external aspect of the arms themselves. In the specimen one arm is lost, two joints of the second are preserved and three of the third. It can not be stated, however, that the arms were complete in three segments. Each arm-joint is much longer than wide and in this differs from *H. problematicus* where they are roughly quadrangular. Whether or not the ambulacra were extended on the external face of the arms can not be stated, but it is certain that no trace of such an arrangement is exhibited by the specimen. All the plates of the calyx are pitted but this appearance is probably of accidental rather than of organic origin.

*Locality.*—Township of Eldon, Victoria County, Ont., J Townsend, collector. Type, No. 566 T. University of Toronto Museum.

*Remarks.*—One cannot fail to be impressed with the strong resemblance of *Hybocystis problematicus* and of *H. eldonensis* to *Hybocrinus conicus*, Bill. and *H. tumidus*, Bill. respectively. The resemblance of *Hybocystis eldonensis* to *Hybocrinus pristinus* is also remarkable; it may be that the new species is comparable with *H. pristinus* and the two stouter undescribed specimens more closely related to *H. tumidus*. The exact similarity in the plates of the calyx has already been established; to this must now be added the close agreement in the structure of the anal apparatus. It is significant also that the recent discoveries should have been made in, or near, the same locality from which Billings obtained his types of *Hybocrinus*. Wetherby has suggested that a sexual difference may be all that divides the two genera; in view of the facts above cited this explanation is worthy of especial consideration. One strong objection urged by Wachsmuth and Springer against Carpenter's decision that these forms should be placed under the Blastoidea, is that the calycine ambulacra extend over the basal plates. In the case of the new species this objection does not hold; further, the large pads under the ambulacra show some slight evidence of being separate calcifications. If this latter fact could be established the radials would become typical "forked plates" of the Blastoids and the pad itself develop into the "lancet plate." While not inclining to this view, the writer thinks it just to Carpenter's conclusions to draw attention to the above facts.

## EXPLANATION OF PLATE.

*Hybocystis problematicus.*

Fig. 1.—Tegminal view with arms removed.

Fig. 2.—Left antero-lateral view, showing the calycine furrow with the cover-plates in the upper portion.

Fig. 3.—Left postero-lateral view, showing the left furrow and the extremity of the right furrow with the supporting pad and the cover-pieces intact.

Fig. 5.—Dissection of calyx.

*Hybocystis eldonensis.*

Fig. 4.—Right antero-lateral view.

---

## BIRD NOTES FROM SOUTHWESTERN NOVA SCOTIA.

By H. F. Tufts.

The latter half of April, 1907, was spent by the writer in ornithological collecting in the vicinity of Cape Sable, Nova Scotia. This is the southwesternmost point of the province, jutting well out into the sea, and in consequence is a port of call, as it were, for most of the north-breeding sea fowl in their spring and fall migrations.

A numerous and energetic population of fishermen hereabout—as much gunners as fishermen—keeps the birds in such a constant state of persecution and harassment, that the collecting of a good series of specimens without undue waste of time is out of the question. There are more favored localities along the shore of Nova Scotia, I have since been informed. However, a record of some notes on observations, and some unusual captures made, may be of interest to those who know not the seashore and its bird life.

To begin with, the season was most unfavorable for this work. Unusually rough and stormy weather prevailed, making it impossible to get out to the outer islands and ledges among which the birds were passing, while many species more or less abundant all winter had already vacated these waters for more northern haunts.

The first observations were made about the more sheltered inner bays about Barrington, some six or eight miles in from "the cape." Here the birds noted were, golden-eyes, in small flocks; red-breasted mergansers, in scattered pairs; a good many brant, which kept together mostly in a few large flocks, and a few black ducks. All of these birds were kept continually on the move by the fishermen and gunners, and were wary to an extreme degree. Black-backed and herring gulls were the only other sea birds noted.

Upon moving out to "the cape" and the unsheltered waters

to seaward a different and more varied lot of fowl came under observation. The most abundant species were the eiders and scoters. The former are known to the fishermen as "sea-ducks," the three species of the latter being collectively called "coots" and differentiated by their most prominent characteristics. Thus the American scoter is known as "butter-nose coot" from the yellow and orange knob at the base of its upper mandible. The surf scoter from the white spots about its head and nape is called "patch-poll coot," while the velvet scoter is quite properly called the "white-winged coot," from its conspicuous wing patches. None of these birds were seen in a state of rest during my stay about the locality, though hundreds were seen daily, always in long wavering strings passing the outer points and ledges uniformly moving to eastward. Taking advantage of this regularity of the birds' movements, the fishermen gunners would put out in their shooting skiffs and stringing out over the water, perhaps ten or twenty boats in all, each a couple of gunshots from the other and partly concealed by the swell and waves of the sea, would intercept the flocks as they came along, often causing great destruction in their ranks.

A few "old squaws" and black guillemots, an occasional puffin, auk, loon, jaeger and a few others were also noted while on these shooting trips, well out from land.

On April 23rd the first gannets were seen. A "flight" of them commenced about 10 o'clock, a.m., and continued throughout the day, the birds passing, singly or in scattered flocks, westwardly along the shore some 100–200 yards off. These gannets have a most characteristic mode of flight—it is remarkably straightforward, the wings beating with a uniform regularity and certain deliberation that forces them into the face of storm with apparent ease. Their beaks seem constantly to point downward, the birds always on the lookout for their finny prey beneath, upon which they drop like bullets as soon as seen. For several days following, this "flight" of gannets was noted between the same hours and in the same direction and over the same waters. At the mouth of the Bay of Fundy is a rocky island known as Gannet Rock, where formerly large numbers of these birds bred and raised their young.

On the morning of April 24th during a heavy southeast storm, which piled great breakers roaring upon the beach, I noted the first "shore bird" arrival for the season. Above the thunder of the surf, while walking along the beach, I heard a soft, flute-like note—a plaintive "phe-blo," it sounded—and upon looking about discovered its origin in a little, dusky-collared, grey and white bird, scurrying about among the

kelp and seaweed—the piping plover. A week or two later quite a number of these birds put in an appearance, and as I later observed, stayed to rear their young. A few days later the semipalmated plover and least sandpipers came along from the south, some of which also remained to breed.

The capture of two birds very rare to the province was made during this trip. On April 23rd a little blue heron was flushed and shot from a salt marsh behind the sand beaches. On the 25th a least bittern was found on the beach, its feet entangled in a mess of eel grass and sea-weed. He was quite alive however. Heavy southerly gales and much fog had prevailed for some time previous and no doubt these birds had thus strayed and drifted from their more southern haunts.

I left this locality for the interior on May 6th, but returned again on the 4th of June en route to Seal and Mud islands, which lie some 20 miles off the coast. Being detained here for two days on account of storms, I again went over the ground of my previous observations. Now of course the sea birds had gone, but about the beaches and sand dunes were many black-breasted, piping and semi-palmated plover, and spotted and least sandpipers. The black-breasts were merely lingering here before moving to their more northern breeding grounds. All the others, however, gave evidence to the fact that they were nesting. Several nests with eggs of the spotted sand-piper were discovered, and the downy-young some few hours old of the least sand-piper were found on the border of a salt marsh near where they were no doubt hatched. I was not previously aware that these latter bred so far south. Piping and semi-palmated plover were also nesting about the pebbly wastes above the sand beach, as they plainly showed by their excited circlings about my head, but diligent search failed to locate either eggs or young.

On June 8th, the weather having cleared, sail was set for Mud Island—20 miles out to sea. Here were found many Leach's petrels, terns, gulls, guillemots and a few eiders, while of the small land birds the Bicknell's thrush and black-poll warblers were the most interesting. Petrels were nesting all over the island, their burrows and musky odor being much in evidence. At the end of each burrow two birds were almost invariably found, but no eggs as yet.

A pair of eiders had built a nest at the base of a large spruce on the high bank overlooking the beach, and six eggs had been laid, but when examined each egg showed a ragged puncture in its side, through which the contents had been largely removed—this without doubt the work of the crows, which here

abound.

The terns and guillemots were inhabiting a small, flat, grass-covered, granite-bound island known as "Noddy" some half mile away, to which a visit proved interesting. The island which contains about three acres, was literally covered with the terns, which arose in swarms as our boat drew near, and hovered overhead, uttering shrill, piercing cries as they darted down at us. Three varieties were here represented—the Arctic, common and roseate, the former being much the most numerous, while the latter were rare. No eggs were yet deposited, but I was told that in a few weeks time the fishermen would come here and gather the eggs by the bushel. It seems too bad that these birds should be thus persecuted and finally driven from their nesting ground as they have from the other adjoining islands where once they swarmed. Crows and ravens also aid in this destructive work—the birds have no friends, despite their beautiful and graceful forms and interesting ways.

On Seal Island, next visited, the gulls, guillemots and petrels were found as numerous as upon the occasion of my visit of a year ago, and all were nesting, here much protected by Mr. Crowell the lighthouse keeper. But the great attraction of this island to me and the object of my expedition hither, was the Bicknell's thrush, its nest and eggs. During the four days spent on the island three nests were collected and others in process of building were noted. These nests were placed in the dense moss and lichen covered spruces, at varying distances from the ground, sometimes close to the trunk, again well out on the limbs. In composition they are similar, consisting of moss, lichens, wool, twigs and dried grasses, quite bulky but withal compact and neat. The full complement of eggs seems to be three, light blue in color, finely speckled with brown. Several nests of the black-poll warbler in varying stages of completion were discovered, but none contained eggs at that date.

## MEETING OF BOTANICAL BRANCH.

The fourth meeting of the Botanical Branch was held at the residence of Mr. J. M. Macoun. Messrs. Whyte, W. T. Macoun, Cameron, Fletcher, Attwood, Clarke and Jones were present. The subject presented for discussion by Mr J. M. Macoun was "Botanical Nomenclature." After briefly explaining the points of difference between the arrangement of orders and genera by Bentham and Hooker and Engler and Prantl, the former being that used in Gray's Manual and the

latter, with some modifications, in Britton and Brown's Manual, Mr. Macoun told of the work of the International Botanical Congress at Paris in 1900 and at Vienna in 1905. The arrangement of genera by Engler and Prantl will, with a few changes, be the one used in future by practically all systematic botanists. This will entail the rearrangement of nearly all Canadian herbaria, as these now are, with very few exceptions, arranged according to Macoun's Catalogue of Canadian Plants which follows Bentham and Hooker. The rules of nomenclature approved by the Vienna Congress and which have already been accepted by nearly all systematic botanists will entail no very great changes in the names of plants as they are known to local botanists who have used Gray's Manual. Between 3 and 5 per cent. of the generic names, and something over 10 per cent. of the specific names will need to be changed. If the Vienna rules are strictly followed a much larger number of changes must be made by those who have used Britton and Brown's Manual.

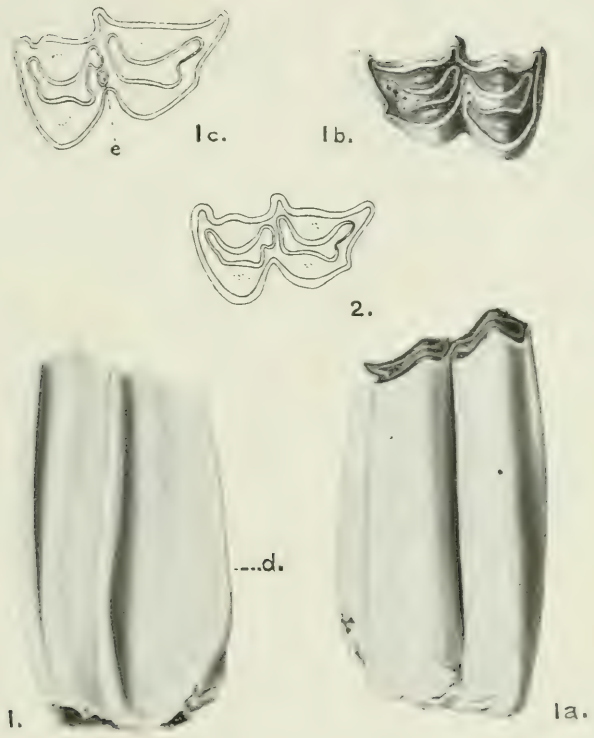
As regards genera the chief point of difference between what is known as the Rochester Code, that followed by Britton and Brown, and the Vienna Rules, is the list of genera to which the Vienna Congress decided its own rules should not apply. It has been decided that botanical nomenclature of both genera and species is to begin with the publication of Linnæus' "Species Plantarum" in 1753, but in order to avoid the very large number of changes in genera which would be necessary if this rule were strictly followed, the Vienna Rules provide a list of names which must be followed in all cases. This list includes about 400 generic names which of course carry with them many thousand species. An important group of American botanists has refused to accept these exceptions and will continue to use the oldest generic names not, of course, going further back than 1753. Most amateur botanists, at least, will welcome the list of exceptions and not hesitate to follow it. By doing so they need not substitute *Panicularia* for *Glyceria*, *Juncoides* for *Luzula*, *Vagnera* for *Smilacina*, *Hicoria* for *Carya*, *Capnoides* for *Corydalis*, *Falcata* for *Amphicarpæa*, *Ilicoides* for *Nemopanthus*, *Pneumaria* for *Mertensia*, *Leptamnium* for *Epilobium*, *Hedypnois* for *Taraxacum*, and so on. A few of the more important rules adopted by the Vienna Congress were given by Mr. Macoun. As these rules have been published in several botanical periodicals they need not be reprinted here. They will be found in the March, 1907, issue of *Rhodora*, in the library of the Club.

J. M. M.

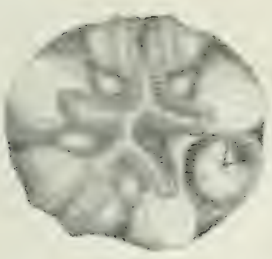
# INDEX

TO THE

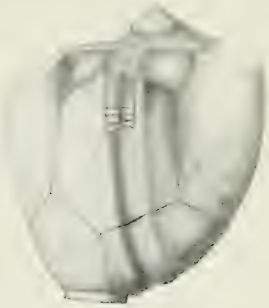
## OTTAWA NATURALIST, VOL. XXI, 1907-8



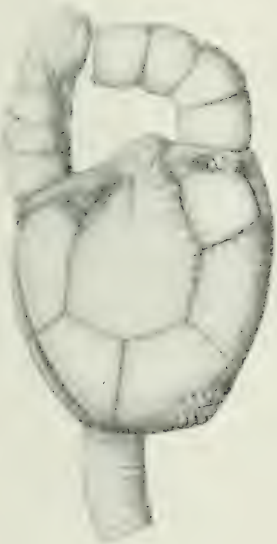

Fossil tooth from Rock Creek, B.C.



1

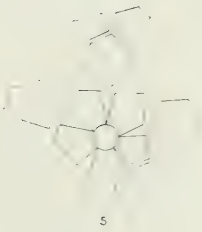


2



3

4



5

Figs. 1, 2, 3 and 5—Hybocystites problematicus.
Fig. 4—Hybocystites eldonensis.